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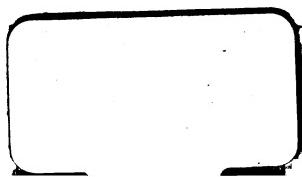
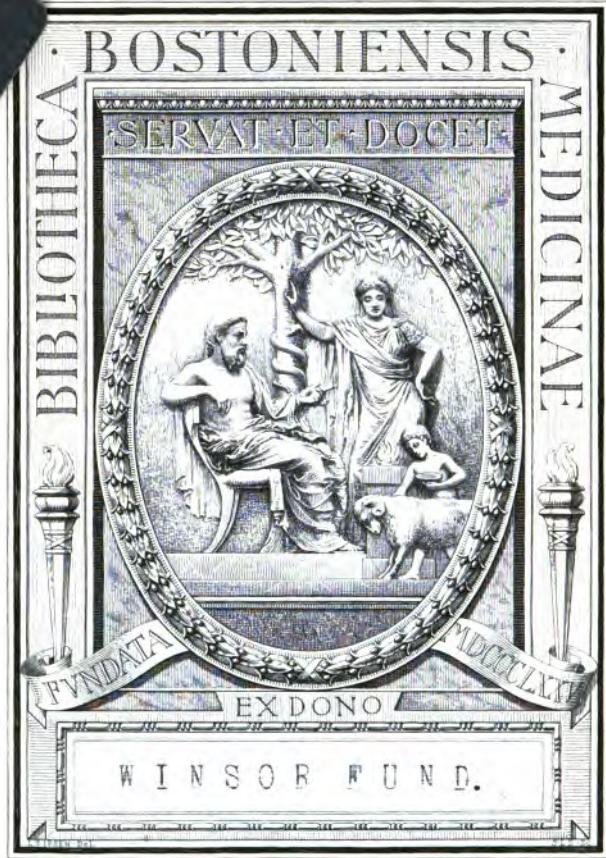
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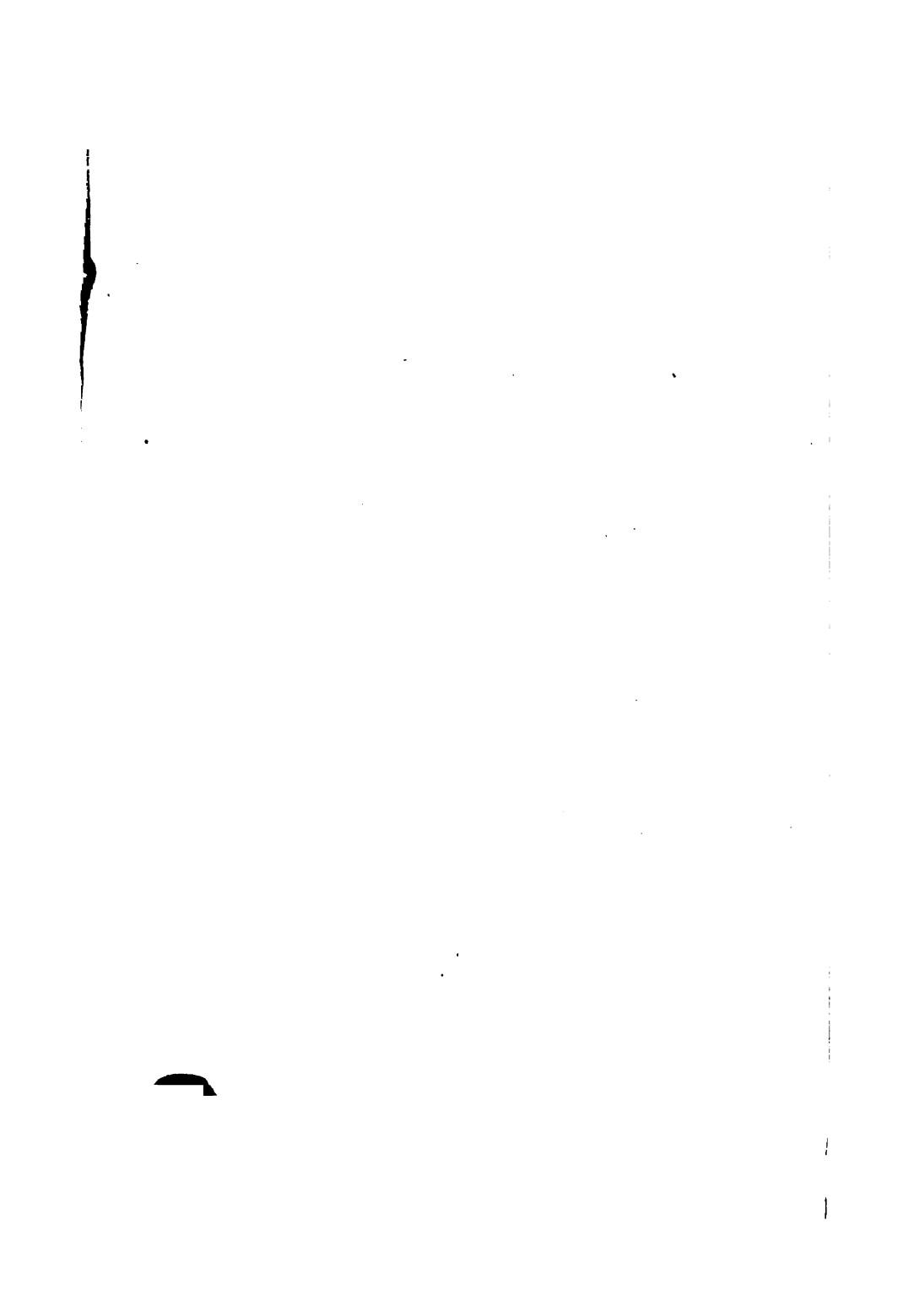
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THE PREVENTION
OF SENILITY &
AND A SANITARY
OUTLOOK &
CRICHTON-BROWNE

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**THE PREVENTION OF SENILITY
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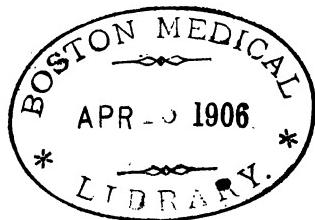
THE
PREVENTION OF SENILITY
AND
A SANITARY OUTLOOK

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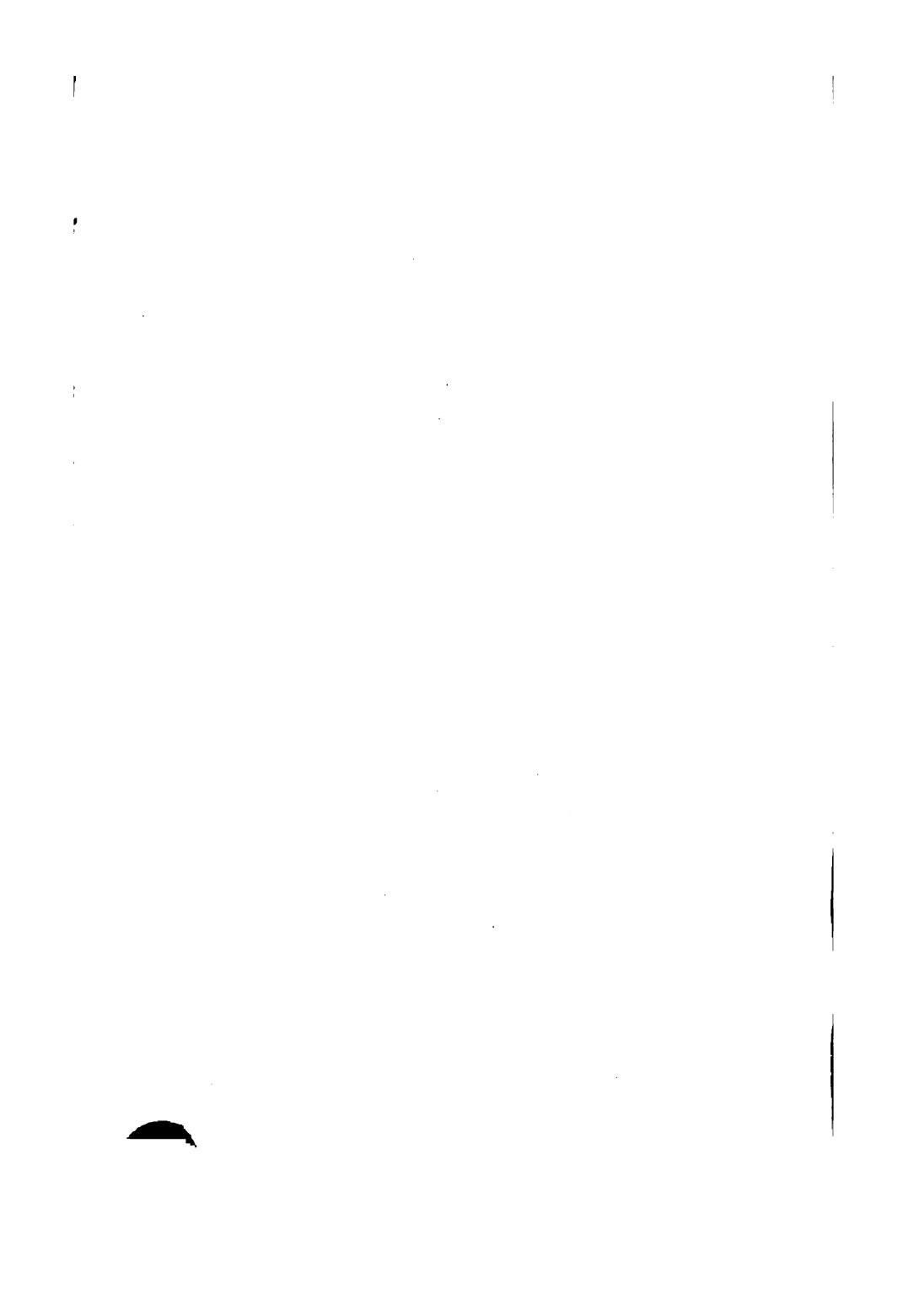
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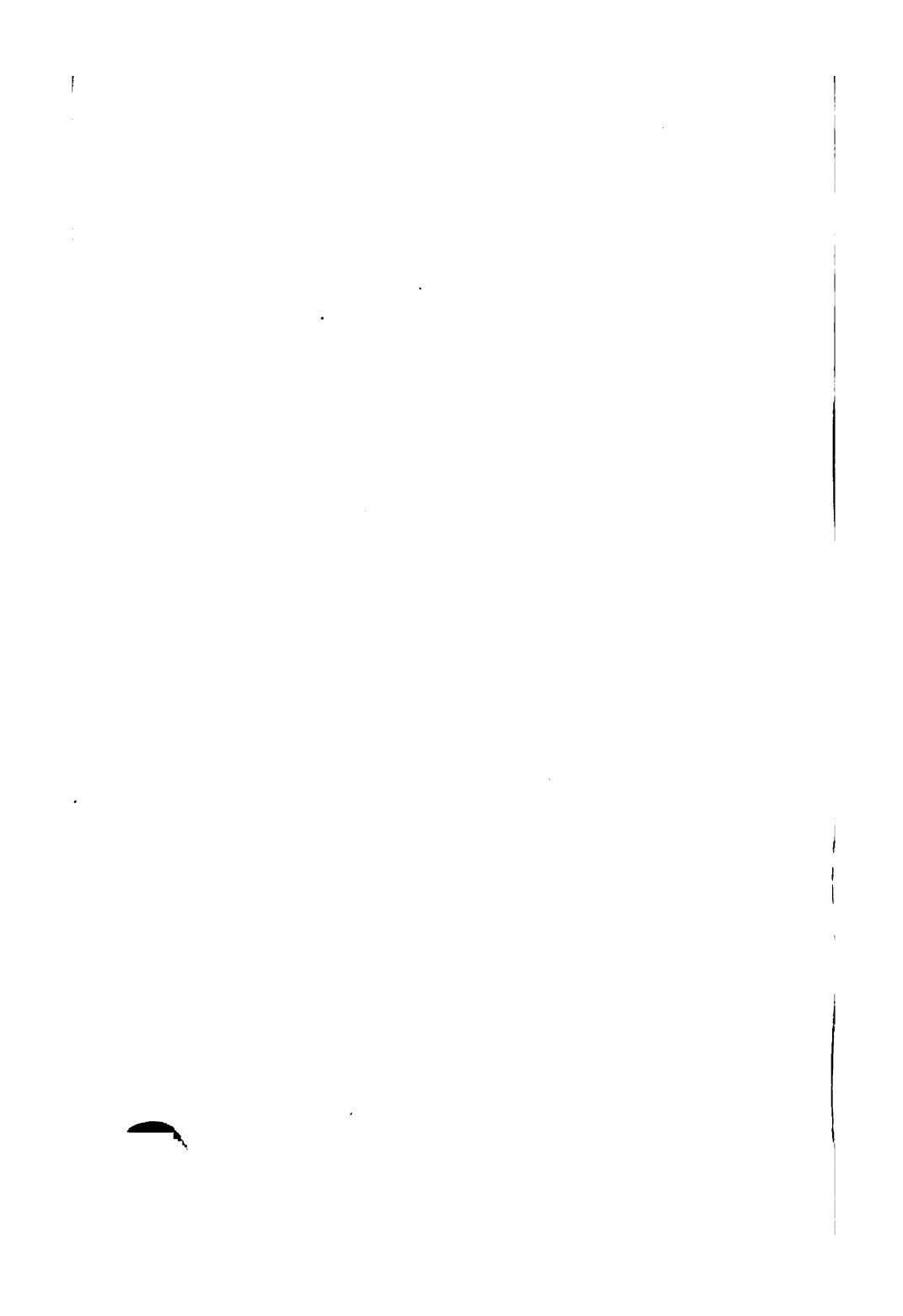
PREFACE

THE two addresses which make up this little book were delivered to audiences drawn together by their interest in vital economy, and both aim at indicating some of the ways by which thrift of life may be practised. Length of days is the best sanitary outlook, and the measures which postpone senility must brighten the health-prospect in all directions around us. Since their delivery the addresses have been asked for, and it is thought that they may be deserving of something more than the hebdomadal remembrance that a Congress confers.



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GLANCING at the subjects of discussion arranged for this section one would infer that preventive medicine is for the young. We are to consider brain-fag in children, the medical inspection of schools, the teaching of school hygiene, municipal milk dépôts, hospital isolation in scarlet fever, and the waste of infant life, and the only topic that is to engage our attention in which the adult is immediately interested is the provision of sanatoria for consumptives. As for old age, it is practically ignored in our programme, for tuberculosis after sixty is a negligible quantity.

It is no doubt in early years that preventive medicine has achieved its greatest triumphs, can in several departments be most effectually carried out, and may confer protective influences

¹ Inaugural address delivered before the Preventive Medicine Section of the London Congress of the Royal Institute of Public Health, July 20, 1905.

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that last far on in life ; but there is, or ought to be, no limit to its operations, and as it is directed against not only disease and death, but degeneration and decay, it should continue its services as long as morbific agencies assail the organism.

It is in the reduction of the death-rate that the potency of preventive medicine, as hitherto applied, stands forth conspicuously declared, and that the promise of its future sovereignty may be discerned. The birth-rate and the marriage-rate may give rise to some misgivings, but the death-rate, paradoxical though it may sound to say so, is a matter for hearty congratulation, for it has fallen, and is still falling steadily. Fifty years ago, in 1854, the death-rate of England and Wales stood at 22·5 per 1000 persons living, and in 1903, the last year for which returns are available, it had dropped to 15·4, a fall of 7·1 per 1000 persons living, representing on the estimated population of 1903 a saving of upwards of 233,000 lives per annum. The rate of 1903 was the lowest ever recorded since the establishment of civil registration, and the rate of 1902 was the next lowest, and that of 1901 the next

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lowest. to that, with two exceptions, so that we have made a good beginning in the new century. And not only in the aggregate death-rate, but in the incidence of mortality on certain age-periods, are encouraging features to be found in the returns of the Registrar-General for 1902 and 1903, for, for the first time in a long series of years, we have a substantial reduction in infantile mortality. The deaths of infants under one year were in 1903 at the rate of 132 per 1000 living, and in 1902 at the rate of 133, against a rate of 152 for the previous five years. The infantile mortality-rate has fluctuated considerably during the last fifty years, having mounted as high as 163, and that in 1899, only six years ago ; but never before has it descended so low, except once, in 1881, when it was 130 ; and as the point now reached is greatly below the average, and has been closely approximated by that of 1902, so that an exceptionally low rate has been maintained for two successive years, we may hope that, after allowing for favourable weather conditions and the freedom of the country from epidemics, it indicates that the warnings uttered and the teachings

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given as regards infant hygiene, and more particularly infant feeding, are beginning to take effect. Until now we have had to acknowledge that all our sanitary and social reforms and improvements have failed to benefit infants under one year of age, and that wasting and diarrhoeal diseases, convulsions, bronchitis, pneumonia, whooping-cough, and measles have carried them off in hecatombs proportionately as large as those which fattened our churchyards and cemeteries half a century ago.

And not only in early infancy, but in second childhood, have sanitary and social reforms and improvements proved futile hitherto, in as far as a reduction of the death-rate is concerned. It is during childhood, adolescence, and the early prime of life that these have proved of life-saving value, most notably from five to thirty-five years of age, when the great fall in the death-rate has taken place; and whenever middle life has been attained they seem to have exhausted their power, or to have been counteracted, and more than counteracted, by adverse influences. It is a remarkable fact, which has been largely lost sight of in our satisfaction at the diminution

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of the death-rate as a whole, that in men at all ages from forty-five to seventy-five there has been a rise in the death-rate, and that in women from fifty-five upwards it has been practically stationary. A comparison of the five decennial periods 1850-1900 brings this out very clearly. To take one example. The male death-rate corrected for age-constitution from fifty-five to sixty-five years of age, which in the ten years 1851-1860 was 31·0, had risen in the ten years 1890-1900 to 35·0.

Now this increase in the death-rate at advanced ages cannot be ascribed to the preservation of sickly lives in early years, for the same salutary influences that have reduced the death-rate must have increased the stamina and viability of the population at large, and the reduction in the death-rate was not really inaugurated until the quinquennium 1876-1880, so that few of the survivors under it have yet reached advanced years. No doubt if we succeed in arresting to any considerable extent the weeding-out process that is now so recklessly carried on in infancy, we shall in time swell the death-rate at subsequent ages by deferred mortality; but

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nothing of that kind has as yet taken place to such a degree as to account for the increased death-rate at middle life and in advanced years. At the ages when we should have welcomed a rise in the death-rate, and at which in an hygienic Utopia death ought only to occur—eighty-five and upwards—the death-rate has fallen. The deaths attributed to old age were in the five years 1866-1870 at the rate of 1275·8 per million living, while in the five years 1896-1900 they were at the rate of 928.

I wish to-day to call attention to some of the claims of old age in connection with preventive medicine. I am aware that any claim put forward on behalf of old age is liable to be scouted in these days. Old age is at a discount! The young are now so knowing that they can dispense with old experience, and no longer believe that “with the ancient is wisdom, and in length of days understanding.” The tendency now is to regard grey hairs, not as venerable, but as a reproach, and in the lavatory of a West End club I read the other day a notice that, numerous complaints having been received

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that the hair-brushes are discoloured by gentlemen using cosmetics, the house committee wish to point out that special black brushes are provided. And hair-dye has its tragic as well as its comic aspects, for in the humbler barbers' shops of our great towns may be seen piles of it for sale to poor working-men, who cannot obtain employment if they show traces of old age. There is, indeed, a school amongst us who would cut off old age as one of those superfluities with which short-sighted Nature has endowed us. It is astonishing, when one comes to think of it, with how many superfluities we are burdened, or have burdened ourselves.

The appendix is, of course, a useless redundancy, of which we should be relieved. The tonsils are of doubtful utility, and are better away. The thymus-gland and the spleen can be removed from guinea-pigs without detriment, and the inference is that they are padding which may be laid aside by human beings with impunity, if not with advantage. No one is a hap'orth the worse for losing his gall-bladder, a receptacle for mischievous pebbles. The whole large intestine

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is a dangerous encumbrance, and Metchnikoff looks forward to the time when, in the progress of surgery, its extirpation by operation will be a normal and routine proceeding. Alcohol is, of course, a poisonous luxury, and so the poor man must be robbed of his beer and the rich man of his champagne—by force if need be. Tobacco is a pernicious weed to be cast aside. Tea is a treacherous compound of alkaloid and tannin that brings misery to thousands, and must be abandoned. Food is partaken of in ridiculous excess, and Professor Chittenden would reduce us to one-third of what has hitherto been considered essential to life, both as regards its proteid and carbohydrate constituents; while M. Berthelot would supply us from his laboratory with little phials or pellets, to be carried in the waistcoat-pocket, each one equivalent to a substantial dinner. Our slumbers are exorbitant and should be curtailed, for Mr. Edison assures us that three hours of sleep in the twenty-four are amply sufficient, and that all beyond that is a mere waste of time! One is reminded of the saying in *Candide*, “Le superflu chose très nécessaire.”

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Considered singly, these proposals may no doubt be supported by plausible arguments, but taken collectively they become extravagant and preposterous. Stripped of his alleged superfluities man would be left a miserable, maimed mortal, limping feebly through a bald and barren existence. The history of modern civilisation, Lord Beaconsfield said, has consisted in the struggles of the West to obtain the spices of the East, and the abolition of "cakes and ale" out of deference to the virtuous physiologist would inevitably administer a check to progress.

But it is not merely the individual body, but the body politic that has its superfluities, and they, too, must be eliminated. Mr. Charles Booth has pointed out that there is in this country a large class of inefficient and worthless persons, who by their irremediable poverty are a burthen on the community, inflating the rates, glutting the labour market, and conducting themselves with reprehensive irregularity in their own homes and on the streets. "Economically," says Mr. Booth, "these persons are not wanted at all. The work of the world could be performed better

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and more cheaply without them ; what they do could be easily done by the classes above in their now partly occupied time, and the money so earned be better spent." They are superfluous, and so in a stronger sense are the habitual criminals, who vary the tedium of life in prisons and convict establishments by costly raids on society, the chronic lunatics who accumulate in asylums, the incurables who occupy beds in hospitals, and the dotards who are helpless from old age. All these are superfluous, and should be got rid of. Laying aside silly sentimentalism, let us dispose of these worthless and inefficient persons. Let us have in each parish, instead of the lich-gate, a scientifically constructed lethal chamber, to which, after due consideration by the Board of Guardians or County Court Judge, with all proper and humane observances, our social rubbish may be consigned. This is the logical outcome of theories that one hears mooted, with more or less seriousness, in certain quarters. It is a corollary of the doctrine of evolution pushed to its legitimate conclusion, for the survival of the fittest involves the destruction of the unfit, and existence must

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cease to be a struggle unless the vanquished are exterminated. Whenever we abandon the ethical or religious standpoint that involves, as Huxley argued, the reversal of the cosmic process, whenever material enjoyment is regarded as the highest good and death as the be-all and end-all, we may justifiably revert to "tooth and claw," and summarily dispose of our superfluous fellow-creatures.

Now I hope I shall not, like my friend Professor Osler, be identified with the views I am quoting in derision, and denounced as an advocate of an atrocious short way with social dissenters or nonconformists. Professor Osler, as you doubtless know, with happy irony quoted from Anthony Trollope's novel, *The Fixed Period*, the suggestion of a college into which, at sixty years of age, men should retire for a year of contemplation before peaceful departure by chloroform; and by those who cannot see a joke that is not of elephantine dimensions he was saddled with this suggestion as a solemn expression of his own matured professional judgment, and had to defend himself against egregious attacks.

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But while the Professor was merely playful in his reference to sexagenarian immolation, he was serious in his treatment of old age generally, and dealt with it in a manner which I cannot but regard as somewhat unjust. He maintained unjestingly, and following closely in the footsteps of the late Dr. George M. Beard of New York, that the effective, moving, vitalising work of the world has been done between the ages of twenty-five and forty, and that above the latter age men are comparatively useless. Subtracting, he said, from the sum of human achievement in action, in science, in literature, and in art, the work of the men above forty, we should be, notwithstanding the loss of a few scattered treasures of great price, practically where we are to-day. It would be an incalculable benefit, he argued, in commercial, in political, and in professional life, if men stopped work at sixty years of age.

The most vigorous period of human life in its entirety is obviously between twenty-five and forty years of age, but to say that men above the latter age are comparatively useless is to fly in the face of the biographical

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dictionary. Much of the best work of the world has been done by men over forty, and we should by no means stand where we are, but be back in the twilight ages, if bereft of what they have accomplished. Nelson was forty-seven when he won Trafalgar, Moltke sixty-six when he entered on the direction of the war of Prussia against France. Bismarck's most successful statesmanship followed on his fiftieth year ; Palmerston and Beaconsfield were swaying the fate of empires when over seventy, and the latter was sixty-six when he wrote *Lothair*. Wren designed St. Paul's when he was forty-four, but continued to decorate London with choice specimens of architecture for another thirty years. Titian's most memorable pictures were painted after he was fifty years of age. Locke's essay concerning the human understanding — the most influential treatise in modern philosophical literature — was published when he was fifty-eight, and Bacon was fifty-nine when the *Novum Organum* was given to the world. Voltaire, the man of his century, went on exercising his extraordinary intellectual influence on Europe till

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his death at eighty-four. Washington was forty-three when appointed to command the army, fifty-seven when elected President of the United States. Franklin was forty-six when he flew his new dispensation kite. Faraday was fifty-three when his great discoveries in light and magnetism were made ; Graham was forty-nine when his memorable work on liquid diffusion, to which modern chemistry owes so much, was done ; Becquerel was forty-four when he elucidated radioactivity ; Rayleigh fifty-two when he identified argon ; and Röntgen was fifty when he distinguished the rays that bear his name. Harvey's discovery of the circulation of the blood was published when he was fifty, although no doubt it dawned upon him at a much earlier age, and his great work on *Generation* appeared when he was seventy-three. Darwin was fifty-six when the *Origin of Species* was issued, fifty-nine when the *Variation of Plants and Animals under Domestication* appeared, and sixty-two when that was followed by the *Descent of Man*. Howard was forty-seven when he embarked on his career as a prison reformer. Verdi,

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who died at eighty, wrote both his *Otello* and his *Falstaff*—not the least meritorious of his compositions—in the last ten years of his life; and Wagner did magnificent work, *Parsifal* included, in his advanced years. The *Bride of Lammermoor*, Scott's finest and most ambitious novel, was written when he was forty-eight, and *Kenilworth*, with the publication of which Moir says the sun of his fame touched the highest point of greatness, was written when he was fifty. Dryden was sixty-six when he composed his immortal ode, *Alexander's Feast*.

I could quote numerous instances in every department of human activity in refutation of Osler's age limit at forty, and were a balance struck between the truly great and effectual achievements of men at thirty to forty on the one hand, and forty to fifty on the other, I am inclined to think that, in proportion to the numbers living in these two decades respectively, the advantage would be with the latter, not only in magnitude, but in profitableness to mankind. And further, I am prepared to maintain that long after fifty, and long after sixty, when, according to

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Osler, compulsory retirement and silence should be imposed upon all sorts and conditions of men, contributions of inestimable value have been made to knowledge and the arts and sciences, while wisdom has flourished like a palm-tree. The Senate of the Ages, like that of Rome, has been composed of greybeards. In modern times the Western nations have put their faith in youthful vigour, but the Oriental view has always been that wisdom and age go together. It was a saying of Confucius: "Until a man is thirty he is like the ivy or vine, with no inherent strength; at forty he is a bare tree; at fifty he puts forth leaves; at seventy fruit."

The fact is, we must discriminate a little, and bear in mind that old age is not a simple but a compound condition. There are three great epochs of life—one of growth, one of equilibrium, one of decline; but that division, useful enough, is by no means precise or complete, for the boundaries of the epochs are ill-defined, and in each of them are included a number of subordinate epochal periods. The several organs and tissues of which the body is made up have widely different life-histories,

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and pass through their evolution, maturity, and involution at different times and at very different rates. They start growing at different age-periods ; they enjoy different durations of maximum activity ; they have different turning-points on their downward journey. No two organs or tissues correspond exactly in their development and retrogression. The life of a man, like that of a nation, is the sum of the lives of an immense number of individuals and communities, cell units and organs, which wax and wane subject to the general law, but under bye-laws of their own. It is literally true that we die daily and are daily born again. Old age begins in the cradle, and youth still lingers in decrepitude. The processes of decay follow hard on the beginnings of growth, and formative energies are still at work when decay seems fully in possession, and it is that fact—the persistence of the formative energies—that I wish to emphasise.

The physiological retrogression of certain organs in early life is a familiar fact. The hyaline cartilage is by its nature a temporary structure. The milk-teeth having served their purpose, give place to more enduring successors.

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The thymus-gland, so active in babyhood, after the fourteenth year dwindles away, passing through an old age of atrophy and degeneration exactly analogous to the old age of the body generally. Several organs show signs of failure in diminished bulk and functional activity before the prime of life is reached, and it is a striking fact that cancer, which is a hanger-on of senility, when it manifests itself in young persons, occurs for the most part in tissues and organs which lose their functional activity in early life, and normally undergo degeneration and more or less absorption.

But besides early retrogression, we have late evolution. There are organs which, instead of having a brief and provisional existence, only tardily develop, and are late in making their influence felt in the cycle of the bodily life, in which for a long period they play their part.

It is in the brain and nervous system that the most instructive illustrations of late and long-sustained evolution are to be observed. The formation of the medullary sheaths of the nerves occurs, not simultaneously over the

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whole nervous system, but in regular order, along definite tracts, and the ganglionic centres are also prepared in due succession, and at an infinitely slower rate, for the performance of their functions. For many years the branches of the cells increase in number and continue to grow longer and thicker, while the cell-body enlarges and the amount of matter contained in it that stains with basic dyes increases. Long after puberty is reached the anatomical organisation of the nervous system continues to advance, although at a slackening rate, and, as I shall endeavour to show, the finishing touches are only given to certain portions of it at an advanced age. I need not trace out the slow and gradual development of sense, movement, and intelligence in infancy and childhood. These are watched with affectionate interest in every household. Neither need I delineate the systematic expansion of the mental faculties that goes on during childhood and youth, and that it is the object of education to stimulate and direct, for these, too, are of common knowledge. Let me rather attempt to make clear to you that there are certain centres

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and groups of centres in the brain which have an evolutional cycle larger than is currently understood, and some of which may be persistently energetic in old age.

There is one group of highly integrated psycho-motor centres situated in the middle region of the brain in which are represented the movements of the hand and arm. The evolution of these centres, which commences soon after birth, proceeds actively and visibly during childhood, more deliberately during youth, and I presume the popular notion is that it is complete at about the twentieth year, for at that age the upper limb seems to have attained its full strength and precision of movement. But that is not so. There is evidence that the hand and arm centres go on evolving till a much later age. Great painters and artists of all kinds advance in manual dexterity, in exactness of execution, in everything that goes to make up masterly handling, till middle life and far beyond it; but in them the hand and arm centres are perhaps peculiarly constituted, and are assuredly reinforced in the exercise of their high calling by the other centres, especially the associa-

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tion centres with which they are interwoven. We find Michael Angelo drawing superb designs for St. Peter's, Rome, shortly before his death, in his eighty-second year, and Hokousai, the great Japanese artist, who up to the age of forty displayed no special genius, after that developing extraordinary power in depicting natural objects—a power which he continued to exercise unimpaired till his death in his ninety-third year. In our own time Watts produced some of his greatest triumphs in the finest technical achievement after he had turned fifty, and Sidney Cooper went on painting well almost to his death, close on a hundred. "The man of solid genius in art," Mr. Spielmann writes, "goes on improving, unless certain faculties give way, till well into the sixties at least."

But the part played by the hand centres in Art is an intricate question, and I must seek a simpler illustration of their evolutional range. Some years ago I made inquiries into the industrial powers of certain classes of operatives in Birmingham, and I had abundant proof that the hand and arm centres do not reach their full maturity, as measured by their

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power of doing work, until about the thirtieth year. A turner, turning buttons out of the cuttings of ivory nuts, I ascertained, who entered that branch of the trade at seventeen or eighteen, gradually increased his production up till thirty, when he would be at his best, and turn out, say, 40 gross, or 6240 vest buttons a day, a gross in the button business meaning thirteen dozen. The increment of output on the part of the operative is, of course, an ever-diminishing quantity—large at first and fining down to nothing; but there is some increment in a large majority of cases up till the thirtieth year, and after that none, let the operator strive as he may. And it is the same in other occupations in which the use of the hand is involved, and in which its labour can be measured. In Bradford I found that weavers of certain classes do not reach the summit of their efficiency until about the thirtieth year, and in Staffordshire the potters do not touch the highest point in their production until the same age.

Now the movements comprised in the operations I have referred to are few in number and simple in character. Once ac-

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quired, we should have supposed that the repetition of them would speedily mount to the highest point compatible with the capabilities of the machinery employed. But, on the contrary, we find that the nerve centres regulating them are still in a nascent condition towards the end of the third decade of life. The long nascent period of the hand and arm centres is not, in the case of our operatives, followed by a proportionately long tenure of maximum vigour. Premature old age soon overtakes them. At about forty-five years of age, the productiveness of manufacturing hands generally begins to diminish, and after that it contracts in an increasing ratio as time goes on. A sawyer in the button trade, whose occupation requires close attention and very quick movements of the fingers, who at forty years of age, in making vegetable ivory buttons, would saw out of the nuts 100 gross of flats a day, will not at forty-five be able to manage more than 85 gross, while at fifty-five his output will fall to 60 gross, and at sixty-five to 40 gross a day. To put it in another way : I found that at the time I made the inquiry, a skilled sawyer who at forty years of

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age could earn 45s. a week, would at forty-five not be able to earn more than 38s., while at fifty-five his earnings would fall to 24s., and at sixty-five to 20s. a week, and this reduction in his wage-earning capacity went on, independently of any impairment of eyesight or general health, and was due simply to the fact that his fingers had become less nimble than they were.

That the hand failure of our operatives after forty-five is premature, and due to excessive wear and tear of the mechanism regulating manual movements, seems probable. The minute division of labour in factories and workshops in these days imposes an excessive strain on certain nerve circuits, while others are left in desuetude. In primitive employments, such as agriculture and navigation, all the different groups of muscles in the body are brought into play from time to time in ever-varying combinations ; but in the industries which modern civilisation has created, small groups of muscles have to repeat their actions with monotonous and fatiguing iteration. Mr. Frank Smith, of Sheffield, has told us that a pen-knife maker has to deliver 28,000 accurate

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strokes with his hammer daily in order to earn a living, and, of course, just so many discharges must take place from the delicate nerve-cells presiding over the muscles lifting and directing the hammer. Little wonder that these cells, firing 28,000 rounds a day, should sometimes become overheated and kick, or should generally suffer erosion. Little wonder that we should have so many cases of professional hyperkinesis or fatigue disease, or that untimely old age should come upon the hand and arm centres in our operatives, or "hands," as we are accustomed to call them.

But there are other centres in the brain, evolved later than the hand and arm centres, and which, later than they, reach maturity and longer retain their power. The emissive speech centres are slower than those of the hand and arm in attaining to adult strength and skill. The infant and child laboriously learn to articulate, and throughout youth and early manhood the acquisition of language goes on. I cannot pause to distinguish the parts taken in speech by the auditory and motor centres, or by the higher centres in which concepts are elaborated, but taking

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volitional language as a whole, I would point out that the command over it is greatest between forty-five and fifty-five years of age. I do not mean to convey that men and women are most talkative then, but I maintain that, as a rule, it is then that they use the greatest number of words to express their ideas, and employ them with the greatest precision and propriety.

Amongst ordinary mortals it is difficult to ascertain when their scanty vocabulary is richest and most fluent. But even in them it might, I believe, be demonstrated by well-planned experiments that between forty-five and fifty-five their powers of expression are at their best. Amongst orators there can be no question that it is at this time of life that their special endowments have secured for them their greatest triumphs. Demosthenes, whose ambition was early kindled, did not deliver his greatest speech, "De Corona," until he was fifty-two. Burke's masterpiece — his impeachment of Warren Hastings — was delivered when he was in his fifty-eighth year. Curran, of whom Byron said "he has spoken more poetry than I

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have ever written," made his most brilliant speeches in the State trials in which he took part between his forty-fourth and forty-seventh years. "I have heard all the greatest speeches of the greatest orators of my time," says Mr. Barnett Smith; "parliamentary and platform-speakers — Butt, Lowe, Disraeli, Bulwer-Lytton, Derby, Bright, Gladstone, Punshon, Gough — and all had their most splendid period from forty-five to fifty-five years of age."

As regards written language, the evidence that its choicest efflorescence comes in what is called middle life is, I think, convincing. Literary genius has often blossomed early and withered too soon to allow us to judge of the best bloom of which it was capable, but whenever literary men have lived to middle age or beyond it, a progressive expertness in the use of the verbal instruments of thought is discernible in their writings. I must not weary you with illustrations, but let me remind you that *Paradise Lost* — a poem which, if it possessed no other merit, would be for ever remarkable for its wealth of words — was completed when Milton was fifty-

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seven ; that the *Lives of the Poets*, Johnson's greatest work, was written when he was seventy - two ; and Fitzgerald's *Omar* when he was fifty-nine.

Musical expression, like speech, reaches its acme in late middle life. Leaving out of account the great musical geniuses, many of whom have gone on improving into a ripe old age, "I should say," Sir Alexander Mackenzie writes to me, "that the second-rate producers reach their zenith at from forty-five to fifty-five years of age. On the whole," he adds, "senile decay is a very rare thing amongst composers, and it seems to me that the practice of musical composition keeps the faculties alert. Verdi, Liszt, Wagner, Rossini, were particularly bright old men."

But higher in the cerebral hierarchy than speech or music centres are others concerned in the manifestation of purely intellectual powers, such as reason and judgment, which come to perfection late and may long preserve their integrity. A preponderance of the work involving calm and powerful reason is done by men from fifty-five to seventy years of age. Kant was fifty-seven when his *Kritik*

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of *Pure Reason* appeared, sixty-four when his *Kritik of Practical Reason*, and sixty-six when his *Kritik of Judgment* was published. Our judicial system in this country—a fabric of which we are justly proud—has been built up mainly by judges from fifty-five to eighty-five years of age, and in almost all countries the most momentous affairs of State have been reserved for the decision of men at this time of life. The late Dr. W. B. Carpenter, when over seventy, said to me: "I am conscious of the decline of life. My perceptions are a little dull, and my memory has lost its grasp. I could not now trust to its safe keeping long strings of words as I did when learning my Latin grammar as a boy, but I am convinced that my judgment is clearer and juster than ever, and my feelings are not blunted." And even memory, so often treacherous in old age, may be preserved intact. Dr. Dollinger, when seventy years old and cursed by insomnia, learnt by heart three books of the *Odyssey*, that he might be able to repeat them to himself in the silent watches of the night. Even at the extreme confine of life

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intellectual power is sometimes retained unimpaired. Henry Dandolo, Gibbon tells us, was elected Doge of Venice when eighty-four, and lived till ninety-seven, shining in his last years as one of the most illustrious men of his time.

And besides judgment and reason there are still other powers of mind—moral and religious sentiments, the crowning feats of evolution—that seem to reach their highest altitude when the close of the day draws near. The fruit is mellowest when it is ready to fall, and the old man, free from canker or blight, sometimes displays new sweetness and magnanimity when his course is all but run. Let me turn to Shakespeare for an illustration of the final and finest evolution of man's nature, which now and again, even in degenerate times, makes old age beautiful and inviting.

Shakespeare never reached old age as measured by years—he died at fifty-three; but with the impatience of genius, he lived the whole life of man in half the allotted span, and shows us in his writings, in due order, in rich luxuriance, in perfect proportion, the

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whole produce of which the best English brain is capable. It is, therefore, with consolation and encouragement that we find at the last period of his literary activity—the period corresponding with old age in the average man, when bodily infirmity had probably overtaken him (for why else did he suddenly retire to the country when at the height of his reputation and making money?)—it is with consolation and encouragement we find at this period a sublimation of his powers. *Cymbeline*, *The Tempest*, *The Winter's Tale*—the fourth-period plays, written when he was forty-seven or forty-eight years of age—do not exhibit the subtlety and strength, the deep speculation and majestic reflection, the passionate energy and prodigality of diction of the tragedies of the third period—*Hamlet*, *Othello*, *Macbeth*, *Lear*, and *Julius Cæsar*—but they mark a transition from anger and conflict to reconciliation and peace.

"In these fourth-period plays," says Professor Dowden, "Shakespeare has attained an altitude from which he saw human life in a clear and solemn vision, looking down through a pellucid atmosphere on human joys and

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sorrows with a certain aloofness or disengagement, yet at the same time with tender and pathetic interest. . . . The writer of these exquisite plays has none of the lightness of heart that is the property of youth; he sees the errors of men, but he seems to have found a resting-place in faith, hope, and charity. The dissonances are resolved into harmony; the spirit of the plays is one of large benignity. They tell of the blessedness of forgiveness; they show how broken bonds may be repaired and reunited; each play closes with a victory of love."

The imitation of Shakespeare is scarcely a feasible ideal to place before mankind in these days, but no better pattern can be presented of the temper, spirit, and piety that ought to preside over life's closing scenes than that set up by the romantic comedies of the fourth period. We may all aim at an old age in which, although natural force is abated, and the physical powers flag, the moral nature, disentangled from sordid ties, and freed from thraldom to passion, rises to serene heights of virtue, where love drives out fear, and faith, strengthened by suffering, reigns supreme over all.

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And such an old age is not an idle dream. Cicero looked at old age from the standpoint of self-assertion rather than from that of self-sacrifice. His ideal old man was an august Roman patrician, crowned with the laurels of the victor, powerful in the Council of the State, stern and rigorous, still capable of new acquirements, like Cato the Censor at eighty-four. But even Cicero has left us softer pictures—as in that of Appius, old and blind, but revered and beloved and animated by the fervour of youth—and has described old age as a time that may be easy and delightful, in which, after a long voyage, land is in sight, and the heart discharges itself of rancour. We, with a wider horizon than Cicero, are able to see in old age, even in humble life, blessings and alleviations that were beyond his ken, and can realise that its strength lies not in the remembrance of doughty deeds or in the egotistic exercise of power, but in the conquest of weakness, in patience and fortitude, and in the dissemination of happiness around. Sadness there must be, but there may be also a sweet expectancy. The way to make old age peevish and repulsive is to rob

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it of the hopes by which it is sustained and tranquillised. Depend on it, the best anti-septic against senile decay is an active interest in human affairs, and those keep young longest who love most. It is a cogent argument against celibacy and the limitation of families that they deprive old age of those vernal influences in which parents renew their youth.

And when with envy time, transported,
Shall think to rob us of our joys,
You'll in your girls again be courted,
And I'll go a-wooing in my boys.

Many examples might be adduced of a beneficent old age. On his eighty-second birthday the Autocrat of the Breakfast Table said : "It is a surprise that we find ourselves growing old ; it always comes to us as a shock when we discover that others regard us as old. Life seems more and more like a dream as one reaches old age. I am well and very happy. My eyesight troubles me somewhat, but I have no other physical ailment." "I witnessed," wrote the late Dr. Parkes, "a beautiful old age in Sir James Clark, physician to Her Majesty the Queen, a man of singular moral power and of very balanced and even mind,

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in character most lovable—the incarnation of beneficence and affection. He lived till nearly eighty, and was active and useful to the last."

Carlyle wrote of his mother, then approaching her eightieth year: "It is beautiful to see how, in the gradual decay of all other strength, the strength of her heart and affections still survives—as it were, fresher than ever—the soul of life refuses to grow old with the body of life: one of the most affecting sights."

The soul's dark cottage, batter'd and decay'd,
Lets in the light through chinks that time has made :
Stronger by weakness, wiser men become
As they draw near to their eternal home.
Leaving the old, both worlds at once they view
That stand upon the threshold of the new.

And not only may old age be serene and beautiful, but it may even be healing and restorative, for it is a remarkable fact that on its advent long-standing insanity occasionally takes flight. The changes in the brain incidental to it seem, now and then, first of all to wipe out the records of the mental disease, and recovery takes place. Not long ago I examined a gentleman, and his case is

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one of many of a like kind I have seen, who, after being twenty-two years in a lunatic asylum and regarded as hopelessly insane, on reaching seventy-two years of age gradually cleared up and entirely recovered his senses, so as to be able to resume the management of his own affairs. The old writers were probably right in believing that man has his grand climacteric at about his sixtieth year, and that marked constitutional changes then ensue.

I have hinted—for time has not allowed more than a hint—that in the higher nerve centres evolution goes on late in life, and that even in what is called old age the freshness of youth may sometimes survive. And I have hinted also that the natural evolution of our nerve centres is largely interfered with, and too often arrested, by unfavourable environment and deleterious habits of life or methods of work, and that old age is thus prematurely induced, unduly abbreviated, or loaded with infirmities that do not necessarily belong to it; and if I were asked to what extent retrogression is thus hastened and old age abbreviated, I would say that it is a good

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working hypothesis that the natural life of man is one hundred years, and that in so far as it falls short of that it is "curtailed of fair proportion." Every man is, I think, entitled to his century, and every woman to a century and a little more, for women live longer than men. Every child should be brought up impressed with the obligation of living to a hundred, and should be taught how to avoid the irregularities that tend to frustrate that laudable ambition.

Metchnikoff, who accepts as probable the assignment of such ages as one hundred to one hundred and twenty years to Biblical personages such as Aaron, Moses, and Joshua, says our inmost convictions assure us that the present duration of life is too short, and expresses his opinion that a science of the prolongation of life can be built up. Even now life is frequently prolonged to one hundred years, for the centenarian is not the *rara avis* that he was at one time supposed to be. Among the deaths registered in England and Wales in 1903, 53 were of reputed centenarians, of whom 17 were males and 36 females. In 1901 and 1902 the numbers had been 61 and

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56 respectively. All these cases had been made the subject of special inquiry, and in each there were grounds for believing that the age stated was correct. They seem to invalidate Professor Ray Lankester's view that centenarians are monstrosities comparable with persons who have attained gigantic stature, for giants are not so numerous, and, moreover, centenarians are, as a rule, remarkable for their health and vigour, whereas giants almost invariably exhibit signs of pathological weakness. In the year 1903, 4946 men and 7685 women — 12,631 persons — died in England and Wales at ages exceeding eighty-five, and of these a considerable proportion were nearly, but not quite, one hundred years old when they passed away.

The tables have been turned upon Sir George Cornwall Lewis and Mr. Thoms. Old Parr, who died at one hundred and fifty-two, prematurely, owing to the sudden change from the simple diet of a peasant to the luxurious and exciting foods and drinks of a courtly gentleman, and whose body was examined by Harvey, who found all the organs sound, was an exceptional and well-

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authenticated case, but the thousands of cases of alleged centenarians collected by Hufeland, Pariset, Easton, Van Oven, and others, were mostly apocryphal. They were founded on error, exaggeration, or wilful misstatement, and the exposure of the fallacious character of a number of them led to the discrediting of all, and to a conviction, supported by several eminent scientific men, that in these days nobody lives to a hundred. But more recent investigations have upset that conviction, and it is now certain that a century of life can be attained, and attained in health and vigour, and is so attained in daily recurring instances. In the number of the *Times* for June 20 last, there were recorded the death of Mrs. Mary Parsons, of Shaftesbury, aged one hundred and four, and the celebration of her one-hundred-and-fourth birthday by Madame Roland of Seneffe, the only surviving witness of the battle of Waterloo. A few days later came the report of a public speech by Mr. Helder in his one-hundred-and-third year. Some time ago there was reported the case of a brave old man of one hundred and two, who in the York Hospital underwent an operation

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for cancer of the lip, without anaesthetics and without flinching, and who made a good recovery. There are now living in Fifeshire, in good health, twin brothers of the age of ninety-four.

We are justified in holding that, given favourable conditions and barring accidents, one hundred years is the normal duration of man's life, the goal which we should hold in view, and at which, if we guide our footsteps aright, an ever-increasing number of men and women should arrive. Why this should be so we cannot say. We can only fall back on Buffon's theory that as each animal has its definite form, its limit of size, and its fixed period of gestation and growth, so each has its fixed period of life which depends neither on food nor climate, but on the constitution of the organism. According to Buffon, each animal is projected into life with an impetus equal to carry it a certain distance, against average resistances, and that impetus in the case of man ought to carry him a hundred years; but the increased friction to which he is exposed by all sorts of artificial obstacles strewn in his course, leads, in an immense

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majority of cases, to an arrest at a point in his career far short of his proper destination. But that is no explanation. It is merely saying in another way that the days of man are fore-ordained. And no explanation is at present possible. Hereditary momentum, modified by environment, undoubtedly gives the trajectory of life, but what determines the momentum? The beginning and the end of life are equally obscure.

We do not know how living protoplasm, that marvellous material able to assimilate, grow, divide, came into existence (for Mr. Burke's radiobes have yet to prove that they are alive), and we are equally ignorant why, in the fulness of time, it should resolve itself into inorganic constituents. Why one cell should be able to reproduce itself 1000 times, and another 1,000,000 times, we cannot say. The occurrence of normal death—that is to say, death not due to accident, starvation, or violence, but to wearing out of the organism—is still a mystery. Cells which exist as free and independent organisms can apparently go on, with or without conjugation, living and multiplying for ever, unless destroyed by

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external agencies. Why should cells, living in aggregations in the tissues of higher animals, in situations in which they are comparatively protected from injurious external agencies, become mortal? Why should the somatic cells become restricted in their power of indefinite reproduction, or suddenly refuse to accept the nutriment around them, and therefore cease to undergo further multiplication? My anticipation is that it will be found that in highly-differentiated multicellular organisms the duration of life of the tissue-cells of various kinds is determined by the trophic control of nerve centres creating the environment of these cells, and exercised by cells not themselves endowed with the faculty of reproduction, but with that higher individualisation that comes when reproduction is at an end. Sudden death of all the cells may at any age result from nervous shock, such as that administered by violent passion, and changes analogous to ordinary senile decay are at once set up in any tissue cells that are cut off from communication with their nerve centres, as by section of a nerve.

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But if, in connection with old age, the causes determining the duration of life and its closure in death are still hidden from us, we may perhaps be more fortunate in solving the problem as to the changes in which old age consists, and by which it is brought about. But here again dubiety reigns, for very different opinions are held as to the essential nature of senility. As commonly understood, it is a highly complex condition, made up of a number of infirmities which are really epiphenomena, and not essential to it. Stripped of these, regarded apart from the many maladies and morbid states which occur in some old persons and not in others, the dregs of bygone follies or misfortunes, it becomes a simple and general, but by no means uniform atrophy, a state of involution in which cell-growth is more than counterbalanced by cell-decay, and which, although there is no question of disease, ends in death as soon as the wasting in vital organs reaches a point incompatible with functional activity. And how is this atrophy or involution brought about? By the voracious phagocytes, Metchnikoff would have us believe. These intelli-

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gent creatures which guard us against microbes and harmful intruders from without, by gathering round them and devouring them, become, according to him, a prominent factor in senile decay by eating up the normal tissues and replacing them by connective tissue. "I am justified in asserting," says Metchnikoff, "that senile decay is mainly due to the destruction of the higher elements of the organism by phagocytes." But why, one is constrained to ask, do the phagocytes postpone their attacks on the tissues until a certain period of life? Why, for instance, do they not devour the brain-cells and the renal tubes when they are young and tender? Oh, we are told, because the phagocytes only obtain their opportunity of victory in the life-long conflict they have waged when the higher elements of the tissues become enfeebled! Exactly. But what is this enfeeblement at a certain age? Why, senility, the very condition which the phagocytes are supposed to induce. It is clear, therefore, that if the phagocytes do eat up the cells in the manner described by Metchnikoff, they are acting as scavengers in the removal of broken-down material and débris,

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and are not the cause of the breakdown by which they profit.

Moreover, one is constrained to ask how it is that the phagocytes do not themselves grow old in that long battle that rages in the innermost recesses of our being. Are they alone of all the elements in the body gifted with perpetual youth? Again, why are they so capricious in their proceedings? In cases of apoplexy, Metchnikoff points out, where blood is shed into a part of the brain, they cluster round the clot, devour it, and secure complete recovery. One would have thought that they would have extended their meal to the damaged and enfeebled brain-cells around, and so aggravated the evil.

M. Marinesco has submitted to Metchnikoff preparations showing destruction of the specific elements of the nervous centres in persons of very advanced age, not brought about by the agency of macrophags. Metchnikoff admits this, but his curious comment is that these preparations were from the spinal marrow, and that the spinal marrow is much less subject to the ravages of senile decay than is the brain. But what has that to do with it? There were

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unquestionably in these cases the changes characteristic of senile decay, not due to macrophags, and their significance in relation to Metchnikoff's views is not affected by the frequency or rarity of such changes in the situation from which they were taken.

Metchnikoff's emphatic statement that in senile decay there is always "atrophy of the higher and specific cells of a tissue and their replacement by hypertrophied connective tissue" is not, as regards the brain, borne out by some observations of my own. In senile dementia I have taken the specific gravity of the grey matter of all the convolutions of the brain in a large number of cases, and in every case, without exception, it has been reduced. The specific gravity of the grey matter of the frontal convolutions of the healthy brain being 1036, that of the grey matter of these convolutions in senile dementia averages 1029, and this means not sclerosis, but simple atrophy, shrunken cells, and nuclei with vacuoles, but not hypertrophy of the connective tissue. In chronic epileptic insanity where there is sclerosis the specific gravity of the grey matter is increased.

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Repeating again that the activity of the macrophags is a dominant factor in bringing about senile decay, Metchnikoff selects as a good example of this the whitening of the hair in old age. Hair before it has lost its colour is full of pigment, but "at a given moment" the cells of the central cylinder, which are a variety of macrophag, become active, and proceed to devour all the pigment within their reach, and, becoming migratory, quit the hair, and either find their way under the skin or leave the body. Yes; but why "at a given moment"? Why should these macrophags, which have been living in amity with the pigment cells so long, suddenly turn upon them and devour them? And why should they do this at such different dates?—for some men are grey at twenty and some not till eighty—and why at such different rates? for the hair may whiten in a night or go on whitening for years. And why should the old-age-inducing macrophags carry off the pigment from one place and deposit it in another? for one of the commonest of senile changes is an accumulation of pigment in and about the cells of the brain.

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Again, an antecedent cause is wanted, and Metchnikoff discovers this, for, shifting his ground as he goes on, he tells us that "in old age a struggle takes place between the higher elements and the phagocytes, the end being usually a weakening in the vitality of the former, while the activity of the latter is enormously increased; so one means of fighting against old age is to strengthen the higher elements of the organism and to weaken the aggressive capacities of the phagocytes." And this is to be done by serum or a series of serums, which will strengthen the tissue elements; and he gravely suggests the injection of a horse (or other animal) with finely-minced atoms of human organs, such as brain, heart, liver, kidney, and the drawing from the horse in the course of a few weeks of serums capable of acting on these organs. He sees difficulties, however, in the way of this "rational method"—save the mark!—because post-mortems cannot be legally made for twenty-four hours after death, and fresh human organs are scarcely attainable, and also because it would take a long time to settle the dosage of these cytotoxic serums.

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"If it be necessary," he adds, "to strengthen the higher elements (nervous, hepatic, renal, and cardiac cells), which it is plain undergo a progressively weakening process, it would be of the highest importance to ascertain the cause of this." The phagocyte as the cause of old age is therefore given up, and the cause of the progressive weakening process takes its place. And what is this? Toxin of one kind or another: Alcohol, the syphilitic virus, and, above all, poisons produced by the bacterial flora of the large intestine—these it is that produce the arterial sclerosis that is responsible for old age. We may put aside alcohol and syphilis, for while undoubtedly they may hasten the advent of senility, they are not its cause, but its complications. Men—the majority of men—grow old without them, and so we are reduced to the products of the bacterial flora of the large intestine, derivatives, perhaps, of indol, creosol, skatol, and so forth, as the efficient cause of old age. Absorbed by the intestinal wall, they pass into the general circulation, weaken the tissues, and give the hungry phagocytes a chance.

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Longevity is, according to Metchnikoff, in the inverse ratio of the length of the large intestine. Birds are practically devoid of a large intestine, and maintain a bacterial flora much poorer than that of mammals, and so geese, swans, ravens, not uncommonly reach the age of fifty years; parrots and parrakeets reach eighty. But there is one bird, the ostrich, that dies young at thirty-five, and that is because, for convenience in its terrestial scampers, it has developed a large gut. But how about fish? The Pacific salmon and other species of this genus almost all die after spawning, which they do when five or six years old, while carp and pike live 150 years, and I am not aware of any differences in their intestinal arrangements to account for this marked disparity in age. The colon and rectum of the ox measure together 7·9 per cent of the whole length of the gastro-intestinal canal, while those of the horse measure as much as 45·4 per cent, but the average duration of life of the ox is fourteen years, while that of the horse is eighteen; so that the latter does not suffer in longevity from the redundancy of his great intestine.

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After all, we are not brought much farther forward by this intestino-bacterial theory of old age, for, again, we must ask why the intestinal toxins of bacterial origin assume the ascendancy at certain very different, but tolerably definite, periods in different kinds of mammals, and why in man should they remain innocuous through five-sixths of his life, to finish him off in the last sixth? His tissues must have become poisonable, and what can have made them so but the old age for which the poisons are made responsible? Why should trees which have no intestines grow old just as animals do?

Metchnikoff believes very firmly in his slow-intoxication theory of old age, and, as I have said, contemplates the removal from all human beings of the whole of that large intestine which is the lair of these poison-breeding and old-age-inducing bacteria. He perceives, however, that we are not yet quite ripe for that heroic measure, and so has other and temporary expedients to suggest. These are directed against fermentation and putrefaction in the large intestine, and so we must use only sterilised milk; we must drink $1\frac{1}{2}$

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litres of kephir or sour milk daily, which will furnish lactic acid that is antagonistic to the microbes of putrefaction, and we must exclude "wild microbes" from the alimentary tract by partaking only of food that has been thoroughly cooked or sterilised, and if we cannot in these ways eliminate all the harmful microbes from the flora of the intestines, we must resort to appropriate serums. We already, he tells us, know a serum specific against the microbe of botulism, which may excite serious disturbance. From such regimen Metchnikoff has known individuals derive great benefit. Thus may the duration of the life of man be considerably increased.

The prevention of putrefaction in the intestine is no doubt very desirable, not only for the prevention of old age, but for the maintenance of comfort throughout life, but I am not disposed to trust to sour milk or any serum as a specific. There is no short-cut to longevity. To win it is the work of a lifetime, and the promotion of it is a branch of preventive medicine.

Since the days of the Ptolemies, when it was believed that emetics and sudorifics would

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abolish the tendency to death, down to the present time, the search for the *elixir vitae* has gone on, and visionaries and quacks have continued to delude or to prey upon mankind. An Abishag was a more rational prescription than that of Marcillo Ficini, a Florentine physician of the fourteenth century, who advised his aged patients to drink youthful blood that they might prolong their lives. "The secret spirit of the adepts," acetone, had antiseptic properties, and the cordials of the Middle Ages, containing lavender, cloves, and peppermint, produced an agreeable sensation of internal warmth, which is more than can be said for some of the hugely-advertised nostrums of to-day. But the philosopher's stone is no longer a myth. It has been brought within the range of scientific investigation.

Believing that the impaired nutrition and degeneration which correspond with senility and end in death are due to a misdirection of that fermentation by which tissue construction and destruction are brought about, Dr. Allchin has been led to take a hopeful view of our power of controlling them.

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Founding on the experiments of Loeb, on what may be called the saline fertilisation of the ova of some of the lower forms of life, he argues that "if it be possible by the application of certain electrolytes to avert from the ovum what may be termed its natural death, similarly to avert the degeneration and death of the tissues of higher organisms may be looked upon as no longer a hopeless quest." As to the exact nature of the quest which he proposes, Dr. Allchin is not very explicit. If it be only a quest for the means of prolonging life within its natural limit, then it is no new thing, and needs no apology, for it is but the pursuit of what has always been the common aim of mankind, and the special goal of medical science. But, apparently, the quest contemplated by Dr. Allchin is to be much more than that. It is to be a search in the complex—I had almost said the metaphysical—depths of bio-chemistry for some instrument by which death itself may be kept at bay. With diffidence he names it to the Royal College of Physicians. "Throughout life," he says, "existence at any

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moment represents the resultant of anabolic and katabolic action, the causal ferments being ever at work. From lack of these, by which synthesis is effected, or by such conditions in the surroundings as arrest or diminish the activity of those by which construction is maintained, the destructive phases of nutrition become paramount, and death, local and final, generally ensues. If nutrition and life be but the expression of the effects of enzymes, equally death is a correlative manifestation. Will it ever be possible, fundamentally, to influence either? To propound such a question as this to a scientific audience would, until quite recently, have been regarded as unseemly, and most assuredly no form of answer could have been attempted. The elixir of life has long ago been consigned to the limbo of the unknowable." But now, he suggests, by the ions carried by a ferment or ferments, the environment of living organisms may be artificially so adjusted that life may be prolonged and death averted. It seems, therefore, that it is the abolition or indefinite postponement of systemic death that Dr. Allchin holds in

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view as a legitimate object of quest. He has brought forth the *elixir vitae* from limbo, and tricked her out in the fashionable scientific costume of the hour.

There can be no objection to the quest. All quests honestly undertaken and diligently followed up are useful, and often lead to discoveries very different from that by the hope of which they were incited, but I confess that to me the quest for a katalyser that will put a stop to death seems to be on a plane with the quest for El Dorado. Against the ions I would place the æons, and ask if it is reasonable to suppose that the little pats of protoplasm of which men and animals are made up are to endure for ever when the heavens wax old as doth a garment. To the law of dissolution all are subject in due season. We prate of the rights of man. His one indefeasible right is to die, and of that neither potentate nor chemist can rob him. It is not proved that nutrition and life are but the expression of the effects of enzymes, and there is a big gap between the egg of a sea-urchin and the soul of a man. It is right that we should strive to prolong life to its utmost natural

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boundary, whatever that may be. I am disposed, like Flourens, to place it at 100 years; Metchnikoff places it at 120. It is right that we should as far as possible give free play to its powers, sweep away hindrances from its path, rid it of the pains and penalties that mar its course, but the attempt to stereotype it, even at its best, would be to court the fate of Ixion. Tithonus would have been no less unhappy than he was in his ashes had the glow of perpetual youth been granted him. It is in "becoming" that true happiness consists.

If Dr. Allchin's enzyme comes, we must, of course, accommodate ourselves to it, but the prospect is of the blackest. It might arrest the degeneration due to auto-intoxication or the toxins of disease, but it could scarcely counteract the effects of simple external poisons like arsenic and alcohol. War, accident, and murder would be as active as ever, and the inequality of existence be more than ever conspicuous, for death would still stalk amongst the crowd of immortals, and select a victim here and there. And if with the abolition of death the power of reproduction

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were retained, the question of over-population would soon become urgent, and an enzyme of sterilisation be a necessary corollary. To those of us whose nearest and dearest have already crossed the bar, the prospect of being harbour-bound here would be intolerable, and at the risk of a verdict of *felo-de-se* we would indignantly decline the injection. Death is not the worst enemy of man. It is, as Lord Lytton said, "only the ceasing to die," and what we have to do is not to abolish it, but to put it in its proper place.

In the elucidation of the difficult problems of nutrition and malnutrition Dr. Allchin has done admirable work, and has supplied us with useful conceptions of the actual changes that are taking place in the living tissues themselves,—conceptions which must help us in devising means of relief in the treatment of disease. I agree with him that vital chemistry will yet give us the means of contending more effectually than heretofore with atrophy and degeneration, and will so help to postpone senility; but I doubt if it will ever repeal the canon fixed against terrestrial immortality. However much we may mitigate the ills that

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flesh is heir to, "our little life" will still continue to be "rounded with a sleep."

We cannot add to the vital impulse with which each individual enters life, but we can see that it has fair play, and prevent it from being spent on passing obstacles and prematurely exhausted. We can make life smoother than it has yet been, more wholesome and more happy. It is by a faithful obedience to the laws of health that old age—a green old age—may be attained, and by a judicious regimen that it may be prolonged. To lengthen as well as to strengthen the lives of the people is the object of preventive medicine. Certain great measures that lie beyond its scope are first of all necessary if we would prolong the days of the masses of our people. Regular employment must be secured and poverty diminished by our statesmen and economists, so that we may no longer have amongst us thirteen millions on the verge of hunger, and dying in multitudes before their time.

But within the sphere of preventive medicine, although much has been done, much—infinitely much—remains to be done. If old age is to be attained a good start in life must

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be given, and hence the importance of these questions as to infant-feeding and milk-supply which we are to discuss here. If it is to be reached by a proper proportion of wayfarers in sound condition, we must reduce the prevalence of those infectious diseases which carry off so many of the young, and often cripple where they do not kill, and we must see that our children have a sufficiency of food, and a sufficiency of teeth with which to eat it. If it is to be wisely pursued, we must foster the self-respect and arrest the degeneration of our people by giving them decent houses, and promote their physical development by affording them facilities for exercise.

Cardinal De Salis, who attained the age of one hundred and ten, when asked by his friends what regimen he had observed, was wont to say, "By being old when I was young, I find myself young now I am old. I led a sober, studious, but not lazy or sedentary life; my diet was ever sparing, although delicate; my liquors the best wines of Zeres and La Mancha, of which I never exceeded a pint at a meal, except in cold weather, when I allowed myself a third more. I rode and

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walked every day except in rainy weather, when I exercised for two hours. So far I took care for the body; and as to the mind, I endeavoured to preserve it in due temper by a scrupulous obedience to the Divine commands, and keeping (as the Apostle directs) a conscience void of offence to God and man."

Peculiarly desirable it is that we should warn the public against those causes of premature senility which operate with disastrous effect when childhood is over. I am not prepared to indulge in any general denunciation of alcohol, but there can be no question that an excess of it does make men old before their time. It induces over-excitation and exhaustion of the nerve-cells, and also vascular paresis and arterio-sclerosis, which is the main feature in pathological senility; and it is especially apt to do this if indulged in at a time when the tissues are approaching the natural limit of their functional activity. And terribly baneful is venereal disease in abbreviating life. To say nothing of its direct effects, and of the part it plays in the causation of tabes and general paralysis,

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Edgren has calculated that 20 per cent of all cases of arterio-sclerosis are traceable to it. Gout and rheumatism are also on a smaller scale instrumental in setting up arterio-sclerosis. Professor Clifford Allbutt has pointed out that, apart from any degeneration of the arterial walls or poison in the circulation, there is often after middle life an abnormal rise in blood-pressure, which, if allowed to persist, slowly ruins the vascular system by overstretching it, and may end in apoplexy. Fortunately however, he says, this increased blood-pressure may be abated or abolished by suitable medicinal and dietetic means, and so he recommends all persons in advancing years to have their arterial pressures tested by their physician every four or five years, so that any disposition to excessive pressures may be averted and the integrity of the arterial tree preserved.

Whatever tends to diminish disease is conducive to longevity, but in our endeavour to promote it, we must have regard to mental as well as to bodily hygiene. A great deal of premature decline in force and energy is due to over-use of the brain and nervous system.

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Dr. McLane Hamilton says that Americans break down at an earlier age than Europeans, especially from nervous ailments, and he attributes this to their struggles for the rapid accumulation of wealth, to the competition and ambition which are largely stimulated by agitational newspapers, to the worries and anxieties of business in which men immerse themselves without recreative relief, to hustling, over-eating, insufficient exercise and luxurious living generally. In all these matters we are not very far behind our American cousins, and if we are to lower our death-rate and promote old age, we must return to simplicity and tranquillity of life. And as regards the masses of our people, we must as far as may be alleviate the anxieties that press on them, and surely one step in that direction would be the establishment of old-age pensions. Life insurance has, by the composure of mind it has secured, done something to prolong life, and national insurance against old age by removing those apprehensions that must sometimes harass even the bucolic mind would, I believe, contribute to a hale old age. The French Chamber of

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Deputies has within the last ten days unanimously adopted a Bill granting relief to the aged and infirm.

We should, I think, take a frankly optimistic and not a fatalistic view of old age. We should not gauge it simply by its capacity for toil. Work is a supreme blessing, but work means much more than the labour by which bread is earned. The world is not a sweating-den nor a big round factory in which piece-work is strictly enforced. No ; it is, or ought to be, a home in which the reckoning is by time, and in which each man should be allowed to live his life, and his whole life, without impediment. But his whole life is not finished at sixty, and while it may be for the public interest that he should at that age quit the special service in which he is engaged, it should not be assumed that he is henceforth useless and a cumberer of the ground. Nothing embitters old age more than the thought that it exists on sufferance, and that its hours are grudged it. Every man should have pursuits to turn to outside his task-work, ideals to which to raise his eyes above the common round, and should realise, as Carlyle came to

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do in his old age, that man's chief end is not in the sweat of his face to eat his bread, sternly incumbent on him though that obligation be, but in the words of the Shorter Catechism, "to glorify God and enjoy Him for ever."

The true philosophy of old age is, of course, to be found in Shakespeare. There we have Adam, almost fourscore — the serving man "not of the fashion of these times," but who gave

The constant service of the antique world,
When service sweat for duty, not for meed—

who, having practised thrift and made

A store to be my foster-nurse
When service should in my old limbs be lame,

was able to say :

Yet am I strong and lusty ;
For in my youth I never did apply
Hot and rebellious liquids to my blood ;
Nor did not with unbashful forehead woo
The means of weakness and debility ;
Therefore my age is as a lusty winter,
Frosty, but kindly.

It is the business of preventive medicine, applying these principles in the light of modern science, to give us hosts of old Adams,

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not of the Biblical, but of the Shakespearian stamp, up to a hundred years, leading a serene, an useful, and honoured old age, like Longfellow's Acadian farmers—

Men whose lives flowed on like rivers that water the woodlands,
Darkened by shadows of earth, but reflecting an image of Heaven.

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ONE of the hopeful signs of the times is the popular interest that is manifested in health questions. No doubt, as Carlyle said, all men are born hypochondriac, and in all ages—never more so than in the present one—swindlers like Cagliostro have driven a thriving trade in well-advertised potions and specifics, but never before has health in the aggregate been the object of public concernment as it now is; never before have the scientific principles that underline its preservation, and the practical methods by which these may be applied, become, to the same extent as now, part of the civil polity of the nation. The whole country is valetudinarian now, in the best sense of the word, conscious of its weakness, determined to recover its strength.

¹ Presidential Address, London Conference of the Sanitary Inspectors Association, August 17, 1905.

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Topics that not long ago would have been thought suitable only for a medical society are discussed in the streets and across the dinner-table, while the newspapers teem with articles on physical deterioration, infantile mortality, tuberculosis, and cancer research.

And this is, I think, as it should be. The intelligent co-operation of all classes is needed in carrying on the great work of Sanitary Reform. There should be no squeamish affectation in ignoring subjects that are of vital and universal significance. There is no mystery in physiology and hygiene, and the better these are understood the greater will be the deference paid to expert opinion in matters in which special knowledge is involved, the clearer will be the appreciation of the boundary where prophylaxis terminates and medical diagnosis and treatment begin.

But the inevitability with which all statements bearing on public health are in these days bruited abroad, and the avidity with which they are received, make it incumbent more than ever on those who speak with authority on such subjects to observe caution and discretion; for doubts or speculations that

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would be harmless, or even stimulating, when addressed to a critical and well-informed audience, may become confusing or misleading when, having passed through the alembic of the journalistic mind, they appeal to the general. I had that brought home to me somewhat forcibly on a recent occasion on reading the newspaper reports, just for one day, of the meeting of the British Medical Association at Leicester. I found there an eminent medical authority reported as giving some countenance to telepathy, which I am sure ninety-nine hundredths of the medical profession regard as an unproven and, in its present shape, improbable hypothesis, and throwing cold water on the sanatorial treatment of consumption, which I believe the great mass of the medical profession regard as a valuable addition to our means of contending with that malady. Dr. Maudsley deplored the want of sobriety in some medical statements on the popular platform, in consequence of which the public has jumped to the conclusion that because the bacillus has been discovered phthisis is curable, the old notions of its heredity erroneous, the objection

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to phthisical marriages obsolete, and the right thing to do forthwith to dot the land with sanatoriums, for which, he concludes, not more can be said than for sensible treatment before their invention.

Now, I have made and listened to a good many medical statements on popular platforms respecting tuberculosis, but I have never become conscious of the insobriety which has shocked Dr. Maudsley. On every occasion, three factors in the etiology of phthisis—the seed, the soil, and the surroundings—have been fully recognised, and while emphasis has been properly laid upon the seed as the primary and essential cause of the disease, due weight has been given to the greater or less resistance of the living tissues in which the seed is sown, and to the more or less favourable nature of the environment during its germination and growth. Dr. Maudsley is the apostle of heredity and of temperament,—matters of great moment,—but I do not know of any hereditary predisposition or temperamental condition that will make a man proof against a sufficient dose of arsenic or strychnia, and we have no evidence that there is any

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that will make him immune to a sufficient dose of the tubercle bacillus of sufficient virulence introduced into his system. The resistance to the implantation of the bacillus and to its spread and propagation varies greatly. In some habits of body it will scarce take root; in others it springs up rapidly and flourishes luxuriantly; but congeniality of the soil is a very different thing from hereditary transmission, and there is no kind of inherited constitution or temperament in which, in the absence of the seed, tuberculosis can be developed. The bacillus has its heredity as well as its animal or human victim, and it is possible that the occasional failure of its attacks may be due, not so much to the stoutness of the resistance offered, as to the feebleness of the assailants, the descendants of an attenuated stock.

Dr. Maudsley says, no one thinking clearly ever thought that actual tubercle may be inherited, but in saying so he must for a moment have lost his wonted lucidity of thought, for Professor Bang has demonstrated that the tubercle bacillus has been found in the livers of the new-born calves of tubercular

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cows. This mode of transmission of the disease is, however, so rare that it may be ignored ; and as it is certain that tuberculosis is not handed down as gout and insanity are known to be, it is right that the public should be taught that the old notion of its heredity is erroneous, and that the main thing to be held in view is the avoidance of the pestiferous bacillus. But it is right also that they should be taught —and they have been so taught from all platforms of which I know anything—that the marriage of a person actually labouring under consumption, or of two persons belonging to families in which a marked liability to take on consumption has been decisively manifested, is imprudent and to be condemned.

The belief for which Dr. Maudsley makes our intemperate platform orators responsible, that phthisis is curable because the tubercle bacillus has been discovered, must have been promulgated, if it exists, by persons in a state of complete obfuscation, for every medical tyro knows that phthisis was curable and was cured in many cases long before Koch's enlightening revelation, and that the espial of the bane did not at once guide us to an

efficacious antidote. But surely Dr. Maudsley will not deny that the discovery of the one true cause of the disease puts us in an infinitely better position for circumscribing its ravages, for preventing it,—ay, and for curing it,—than we were in before. We know now that it is the outgrowth not of any subtle tendency passed on from generation to generation, but of a fungus which invades the body from without by certain channels, and has a definite life history which, outside the body, has certain favourite haunts, and may be destroyed by certain agents, and inside the body may have its growth encouraged or retarded by certain conditions which it is in our power to create or modify.

Phthisis is still killing upwards of 40,000 persons in England and Wales annually. Tuberculosis in all its forms is killing upwards of 57,000, but the mortality from phthisis and tuberculosis has fallen enormously, and is still falling. Twenty years ago—and during that time there can be no question as to improved diagnosis or change in nomenclature vitiating statistical returns—phthisis caused upwards of 49,000 deaths; to-day it is causing only about

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40,000 per annum ; tuberculosis caused upwards of 20,000 deaths ; to-day it is causing not more than 17,000. Twenty years ago the annual death-rate from phthisis was 1827 per million living, against 1203 in 1903 ; the death-rate from other forms of tuberculosis was 567 per million living, against 459 in 1903. In as short a period as 20 years the death-rate from phthisis was reduced as much as 25 per cent. Surely these figures justify platform speakers in some degree of exultation, if not of insobriety, and warrant them in exhorting the people to persevere in the use of the means which have secured such splendid results, and to supplement these by other means suggested by our new knowledge of the cause of the disease. The reduction in the mortality from phthisis and tuberculosis has been due, we know, to subsoil drainage, and the other great sanitary improvements that have been effected in the last half-century, and has taken place in the absence of any special precautions against the dissemination of the seed of the disease. Is it too much to hope that now that we know this seed, and can intercept and destroy it at the shoots by which it is dis-

charged from its culture-beds and granaries to be scattered broadcast, we shall be able still further, and more materially, to reduce the tuberculosis death-rate and the prevalence of the disease ? Nay, further, is it too much to hope that by removing those who have contracted the disease from the impoverished, insalubrious, and ill-regulated conditions of life that have invited and fostered it, and by immersing them in pure air and unpolluted sunlight, in restful and hopeful circumstances, with a liberal and well-adjusted diet, and under constant skilled medical supervision, so that untoward symptoms are dealt with as they arise, and every bodily function is ordered, as far as may be, in the interests of health—and this is what sanatorium treatment consists in ;—is it too much to hope that we shall thus save many lives that would otherwise be lost, and prolong the days and alleviate the sufferings of those who are beyond the reach of permanent recovery ? Our sanatoriums in this country have not yet been in existence for a sufficient length of time to allow of the collection of wholly trustworthy statistics, but the returns as far as they go are highly en-

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couraging, and confirmatory of the favourable verdict on sanatorial treatment arrived at by German institutions.

Dr. Maudsley himself admits that so far the outcome of experience seems to be that many patients who are sent to sanatoriums in the early stage of the disease recover if they are kept long enough, that most of those in a more advanced stage improve while they are there, frequently relapsing afterwards, and that those who are badly diseased ought not to be sent at all. And this he calls a modest result. I am disposed to describe it as a result of which we may well feel proud, and as one that, if properly presented to the public, should lead to the adoption on a larger scale than hitherto of this system of treatment at that stage of the disease when it may prove so efficacious.

The benefits to be derived from sanatorial treatment have perhaps been exaggerated in prospect. It cannot altogether supersede other forms of treatment, at high altitudes, on sunny littorals, on the veldt, prairie, or desert, or by sea voyages; it cannot reconstruct a disorganised lung; but to those whose means do not

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enable them to command the best treatment under private care, and in whom the tubercular lesions are still of limited extent, and leave enough breathing space, it opens up new hopes of restoration to health. Even to the affluent sanatorial treatment is profitable in the medical discipline and freedom from small worries it involves. The time may come when science will give us some tuberculin, or serum, or antitoxin, or antiseptic, that will kill the tubercle bacillus in its hidden lair, counteract its poisonous products, or reinforce the phagocytes in their attacks on it; but meanwhile sanatorial treatment gives expectations of recovery greater than those of any other kind of treatment that is known to us, and it seems to me inexpedient to say anything which may discourage the benevolent from putting it within reach of the poor and needy, or hinder the poor and needy, stricken with tuberculosis, from taking advantage of it. Even if sanatorial treatment was not superior to home treatment in the number of recoveries it effected, it is still deserving of support, because it withdraws, for a time, from their own homes, and from places of public resort,

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persons who are jets of deadly dust, and thus diminishes the diffusion of tuberculous disease. And surely even the arrest of the disease which Dr. Maudsley admits is secured by sanatorial treatment in advanced cases is worth having. Even a damaged life is sometimes sweet to its possessor, and precious to those who hold him dear; and it will be a sad day for humanity when the prolongation of life under all circumstances ceases to be the chief aim of the medical profession, and when euthanasia, procured or suffered, is recognised as a justifiable mode of exit from the sick-room. But beyond all this, even in hopeless cases in which no arrest is secured, sanatorial treatment is not without its merits, for all patients who have undergone it return to their homes educated in the procedure that is necessary to make them innocuous to others, and trained how to deal with their infectious expectoration, and thus again the propagation of the disease may be in some measure limited.

But Dr. Maudsley is not only sceptical about sanatorial treatment, but apparently doubtful of the wisdom of any sort of curative treatment in tuberculosis. The ordained

function of the bacillus in the universe, is, he suggests, to make away with weak humanity. The loss to the community by the death of consumptives is not, he hints, as real as is imagined. "Might not the ultimate cost to the commonwealth," he asks, "be greater were those persons allowed to go on living and breeding in it?" The assumptions here are that consumptives inevitably breed consumptives, and that the tubercle bacillus invariably fastens on weak humanity, and both these assumptions are erroneous. Recent inquiries have shown that the influence of heredity in consumption is not so great as was at one time believed. Dr. Claud Muirhead found, after an elaborate investigation, and with peculiar facilities for arriving at the facts, that out of five hundred and twenty-four cases of death from phthisis, only one hundred and twenty, or 22·89 per cent, presented in their family history distinct evidence of direct phthisical taint, and other sixty-two, or an additional 11·83 per cent, exhibited a suspicious family history of phthisis. That is to say, at the very outside, only 34·72 per cent of these five hundred

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and twenty-four persons who died of consumption exhibited in their family history any evidence of family predisposition to the disease. This percentage accords pretty closely with the published statistics of Dr. Williams and Dr. Cotton, who give, as the result of their investigations into this point, 34 per cent and 36 per cent respectively. In an inquiry carried out by Dr. Squire, he found that while about 33 per cent of consumptives present a family history of tuberculosis, statistics give grounds for attributing the disease to occupation and surroundings in by far the greater number of these cases, and place the possible influence of heredity at about 9 per cent instead of 33 per cent.

It is certain that persons who have recovered from consumption breed perfectly strong and vigorous children, who remain throughout life free from the disease, and it is nonsensical to suggest that if we succeeded in saving the lives of the 40,000 persons who die annually of consumption we should have thereby added to the burdens of the community. We should thereby directly and indirectly have secured enormous economic

advantages in the productive industry of the persons saved, and in their contributions to the maintenance of those dependent on them. Mr. Baldwin Latham estimates the saving to this country in twenty years by sanitary work, in funerals avoided, sickness prevented, and wage-earning powers retained, at £267,141,060, and of that huge sum a big slice must go to the credit of tuberculosis. Mr. Russell, of the Ancient Order of Foresters, has found that the average cost of sick pay to a consumptive member of his Court is three times as great as the pay to any person dying from another disease. A man dying from consumption costs the society £21, and a man dying from another disease only £7.

Then, again, vulnerability to consumption does not necessarily imply either bodily or mental weakness. The disease is most fatal in the prime of life, and strikes down, not merely the feeble and incapable, but the strong and vigorous, catching them at some moment of temporary debility. The intellectually gifted seems to be peculiarly susceptible to it, and it has robbed the world of incalculable benefits in the fruits of genius.

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It is not by any means merely an eliminator of waste material, but a ruthless destroyer of some of the finest elements of our species, and we need have no misgivings in resisting it and in doing our best to extirpate it altogether. The enormous reduction that has taken place in the mortality from consumption has been an unmixed good, and its final disappearance from amongst us, which is not a chimera, but a reasonable anticipation, will be attended by nothing but gain to mankind.

Dr. Maudsley thinks we shall never be able to keep bacilli out of the body. Well, as regards the tubercle bacilli, we mean to try. And his gloomy prognostications in this matter are considerably discounted when we find associated with them some disparagement of antiseptic surgery and of the sterilisation of food, because, forsooth, there are hundreds of different kinds of bacilli in the human mouth and intestines, and because the nutritive value of certain kinds of food may be reduced by sterilisation. Our operating theatres, as they exist to-day, and every kitchen range, are a standing protest against Dr. Maudsley's extraordinary impeachment. Surgeons do somehow

succeed in excluding from wounds bacilli of an injurious character in injurious numbers, and a recent experience in Birmingham suggests that the ice creams there would have been none the worse for sterilisation by boiling, even at the sacrifice of the whole of their nutritive and glacial virtues.

I venture to think that Dr. Maudsley has spoken too despondently about the sanatorial treatment of consumption, and I regret the wide publication of his views, because, coming as they do from one so eminent in his profession, they may tend to check a movement of great promise.

In the same newspaper that contained Dr. Maudsley's fling at sanatoriums, I read a report of a discussion on physical deterioration that must, I think, have proved somewhat bewildering to the man in the railway train. Physical [deterioration was affirmed and denied; it was traced to education and to the want of education. It was declared to be decimating our infant population and to be non-existent till the age of thirteen. It was ascribed to under-feeding and over-feeding, to cheap sweets and cigarettes, to

maternal neglect, paternal drunkenness, and the want of a Minister of Public Health of Cabinet rank. I cannot pause to reconcile these apparently divergent views, for, of course, they are reconcilable, but there was one statement made so startling that I should like to refer to it more particularly. And that was that "environment would knock heredity into a cocked hat," a statement leading to an article in the paper headed "The Bubble of Heredity pricked," which must mean that organic creation has burst up. Now it may be well that there should be a reaction against an extreme and fatalistic belief in the power of ancestral sour grapes to set the children's teeth on edge, but we cannot altogether dispense with heredity, and any one who will contemplate a sheep and a cow, and a goose and a rabbit, all brought up on the same common, fed on the same grass, and exposed to the same weather, will realise that there are limits to the power of environment. Tremendous are the potentialities pent up in those little particles of protoplasm—the germ and sperm cell. The truth is that heredity lies at the core of things, while

environment plays on the surface. Their reciprocal influences may be detected in every living being. Heredity modifies environment, and environment deflects heredity, always within bounds and under some higher authority that controls the two. The plan of the edifice is practically fixed, but its dimensions, stability, symmetry, soundness and adornment, are subject to modification as the building goes on, and must depend largely on the nature of the material supplied, and on the character of the builders. Heredity is in every individual made up of two convergent hereditary streams, and becomes solid at the centre, but has a fluent edge, and it is on that that environment operates. It is of great importance that we should accurately distinguish between those environmental influences that are temporary in their effects and modify the individual or existing generation, and those that are permanent and, as it were, sink in and modify the race.

It was in connection with the former of these that the contemptuous treatment of heredity at Leicester, to which I have alluded,

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took place. Dr. William Hall, who has done so much to stir up an active interest in the feeding of school children, impressed by the prompt and striking results he has witnessed by beneficially influencing their food environment, threw discredit on heredity, and not only so, but argued that there is really only one important element in environment, and that is food. He went so far as to say that food altered the whole condition of the individual, and that the children in the slums of our great cities, properly fed, could be reared superior in physique to children reared in better-class districts, which, from his own point of view, proved rather too much, for if the slum children when well fed are superior to the better-class children, presumably equally well fed, then they must have inherited more vigorous constitutions, or the better-class children must be retarded in their development by conditions other than food. Amongst the Jewish children in Leeds, examined by Dr. Hall, who were so much stronger and less rickety than the Gentile children living in the same district, careful feeding may have been, and probably was, the

principal factor in their better health and vigour, but there were other factors which should not be overlooked. Racial characteristics must count for something. Dr. Hall says that the poor Jew is more self-reliant, temperate, and has a greater power of resisting infectious disease than the poor Gentile. Does he suggest that these traits must also be attributed to feeding? Then the Mosaic law bears on personal hygiene through other channels than that of diet. The Tenth Ward in New York, the population of which consists almost entirely of Russian and Polish Jews, is the most densely populated in the city, both as regards the number of inhabitants to the acre and of tenants to the house, and notwithstanding this the Tenth Ward has the extremely low death-rate, for New York, of 17·14, and is surpassed in healthfulness only by two wards out of the twenty-four of the city—one a business and the other a suburban district. Now this favourable death-rate and general salubrity of the Tenth Ward is not the result of superior economic conditions, or better feeding, for the people are of the very poorest class,

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but must be credited to cleanliness and that careful observance of domestic sanitation in all its branches enjoined by Hebraic rule and custom. Until our friends, who protest that heredity is nothing and food everything, have converted a negro into a white man by rearing him on blanc-mange, we shall continue to attach some little importance to ancestral traits.

No one will under-rate the importance of the part played by food in physical development, or the sinister effects of a deficiency of it, especially when growth is going on, in the production of degeneration ; but, as Dr. Dawson Williams pointed out, it is going too far to say that the whole of the unfitness of the race is attributable to the lack of food. Many other causes contribute to that. A little later Dr. William Hall seemed himself to realise this, for he affirmed that poverty—a very comprehensive term, covering a multitude of evils—is ultimately responsible for the unsatisfactory physique of our people. Luxury has its degenerates as well as poverty, but poverty is the wholesale degenerator, and it is therefore, I am sure, with immense satisfaction

that all we who are interested in the public health, have heard that it is the intention of the Government to appoint a Royal Commission to inquire into the working of the Poor Law. It is to be hoped that the deliberations of that Commission will lead not only to the adaptation of the Poor Law to modern social conditions, but to the discovery of efficient methods of dealing with what may be called incipient pauperism, or pauperism in the making ; of distinguishing between professional paupers and the widely different classes that are from time to time in need of relief owing to fluctuating economic conditions, sickness, immaturity, or senile decay ; and of ensuring that there shall no longer be death or disease due to actual starvation amongst us. If the Commission can solve the problems thus indicated, and if at the same time our statesmen can in their wisdom, by free trade, or retaliation, or tariff reform, or colonial preference, or in any other way secure steady employment to all who are willing to work, we may then feel sure that the golden age will not be long delayed.

But we cannot sit with hands folded waiting

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for the golden age to be conferred by any Government or Commission. We must strenuously persevere in our endeavours to ameliorate the condition of the people, and this we can best do by improving their environment in the widest sense. It is with environment you are officially concerned, and sure I am that you have already, by your up-hill labours in mending it, left your stamp on the condition of the people. Indeed, I am inclined to think that if there had been no sanitary science, and no sanitary inspectors, the environment in this country would by this time have been pretty nearly empty in certain localities. The right hand of the Medical Officers of Health, and with special functions of your own, you have in a multiplicity of ways promoted that cleanliness which is not inferior to godliness in giving a man length of days in the land. You have sweetened our lives by curbing the offensive cupidity of tradesmen and manufacturers. You have protected us from secret poisoning in our food, on a scale that the Borgia never dreamt of. You have, at no small risk to yourselves, warded off from us contagious, infectious, and epidemic

diseases, and extinguished sparks of them which but for you might have become ruinous conflagrations. You have even in certain cases provided us with mortuaries and superintended our burial.

Your duties as sanitary inspectors bring you into intimate contact with the people of all classes; you are better acquainted than any one else with their environmental conditions, and you will, I think, agree with me, that of these the one most urgently in need of consideration at this moment is their housing. It would take many addresses to deal with the housing question in all its aspects. It is a large question. We have, on the one hand, men with half-a-dozen houses of palatial size, standing in broad demesnes, empty for the most part or thinly populated by a retinue of pampered domestics, and we have, on the other hand, half-a-dozen pinched families huddled into one mean hovel reeking with filthy effluvium. It is, of course, mainly with the hovel-dwellers that sanitary reformers are concerned, and these present difficulties which may well tax their energies for a long time to come. They are everywhere, for from all

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parts of the country come complaints of over-crowding in wretched dwellings. It is, of course, in the large towns where benevolent enterprise is moving that we hear most of these evils; but they are by no means confined to the great centres of population, in which, however, they are growing at a rate that can no longer be overlooked. Our town population is, as you know, swelling portentously at the expense of the country. Thirty years ago the population of England and Wales was equally divided between town and country, but now three fourths of it are town dwellers, while only one-fourth remains on the land, and the cry of the town is "still they come." According to the last census, the persons enumerated in urban were to those in rural districts as 335 to 100, whereas ten years previously they were as 250 to 100. The increase in the proportion of the population in urban districts is due partly to the growth of these districts themselves through the absorption of areas which were previously rural, but in a far larger degree to the migration to the towns of country-people, and, as the provision of housing accommodation in

urban districts has by no means kept pace with their increase of population, overcrowding has thickened and slums have multiplied.

I need not describe to you the state of matters which has resulted—a state of matters in many places deplorable and repulsive. We have in London 300,000 persons living in families of two or more in one-roomed tenements, in which privacy and decency are impossible, often without the smallest ray of sunshine summer or winter, with walls and floors in every stage of dirt and decay, with an atmosphere that is stifling and not seldom alive with vermin. Mr. Burns told us that not long ago in Glasgow, where the housing problem is being so vigorously grappled with, there were places where the floors of the houses were let out at a penny or twopence a place, so that any one could lie down on his pennyworth, and all huddled together for warmth in a dense mass of struggling humanity till the morning came. “There were,” he said, “two places where the only accommodation given was a cord stretched across the room, on which, on the payment of a penny, men were entitled to rest their arms and sleep standing.”

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I do not know that in many places things are quite as bad as that, but in all our large towns, and in our small towns too, housing conditions and overcrowding exist that are an outrage on decency and a disgrace to our civilisation.

And heavy are the penalties we pay for these housing conditions and this overcrowding in combination with other insanitary influences that appertain to towns! The urban death-rate for England and Wales is 17 per 1000 living, the rural death-rate is 12·9; the urban infantile death-rate is 165 per 1000 births, the rural rate is 126. In every city and town, with the increasing density of population on square space, there is an increasing general and special mortality at all ages, but particularly under one year, in insanitary areas. Typhoid fever causes a much greater loss of life in the town than in the country. The urban death-rate from pneumonia exceeds the rural by 87 per cent. The mortality from consumption is at the rate of 1298 per million living in urban districts and of 1108 in rural districts. Urban areas suffer more severely from cancer than do rural areas. And almost all these diseases, as well as others which I

have not mentioned, because they figure less largely as causes of death, are most prevalent in the most densely built parts of the town, and in the most densely populated areas of these parts, and prevail in these areas in proportion to the number of inmates in the houses, of persons per room, and of insanitary dwellings such as back-to-back houses, stable dwellings, tenement houses, cellar dwellings, and flat houses.

That the townsman is shorter lived than the countryman is incontrovertible. Dr. Tatham calculated that in the rural districts of England the average expectation of life at birth is 51·48 years for males and 54·04 for females, whereas in Manchester it is only 28·78 for males and 32·67 for females, which means that each male has to sacrifice 10·48 years or 39 per cent of his life, and each female 9·82 years or 34 per cent of her life, for the privilege of being born in an urban area. To show the social waste involved in such heavy mortality, it is enough to point out that 100,000 males born in Manchester would be reduced to 62,326, and 100,000 females to 66,325 in five years; while in the healthy districts it would take

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fifty and forty-eight years respectively to bring about the same reduction. Clearly the concentration of the population produces a prodigious drain on the vitality of the people, another indication of which is supplied by Dr. Shrubshall's observation that town life tends to extinguish the fair-haired Scandinavian and Teutonic elements in our people, which are giving way before the brunette elements of Southern derivation.

And the pernicious consequences of such concentration are discernible in other directions. The children reared in towns are on the average at all ages shorter, lighter, and of inferior chest-girth when compared with those brought up in the country. They suffer in a larger degree—and in some towns to a very alarming degree—from rickets, decayed teeth, defects of vision, deafness, adenoids, glandular enlargements, and affections of the heart and lungs; and again it is demonstrable that all these degenerative changes are more numerous in children living in houses of one or two rooms than in those living in houses with three or more apartments.

I need not proceed with the sanitary indict-

ment against town life as now constituted. Its misdeeds are written in characters unmistakable to any one with half an eye—in the pale faces and stunted and misshapen bodies seen in swarms in slum areas, and are recorded in family Bibles, if such pious mementoes are still in vogue, for Mr. Cantlie, after prolonged and careful search, could not find a single person whose ancestors from their grandfathers downwards had been born and bred in London. But I should like to say a word or two about one of the countervailing advantages of town life, which is often insisted on, and that is, that by the mobility and stimulus it affords it encourages that ascent of individuals from the lower to the upper social ranks upon which the salvation of society depends. It is, we are told, the concentration of population in cities which best promotes the process of bringing capable men to the front, and recruits the real aristocracy of ability and character amongst us. And if that is so, then we must be content to put up with a good deal of destruction of human vigour, in return for the work done by cities as instruments of natural selection in weeding

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out the incapable and inefficient and advancing the more capable members of society, and in providing us with intellectual leaders. But is city life likely to accomplish all this?

Professor Karl Pearson, a very thoughtful and cautious anthropologist, has told us that decadence of character and of intelligent leadership is to be noted alike in the British merchant, the professional man, and the workman. There is a paucity, he says, not only of the better intelligence to guide, but of the moderate intelligence to be guided. And this he attributes to the fact that the intellectual classes are not reproducing their numbers as they did fifty or a hundred years ago. And in this view Professor Pearson is supported by the Prime Minister, who said at Cambridge last year that, in the case of every man who left the labouring class and became a member of the middle or wealthier classes, his progeny were likely to be diminished, owing to the fact that marriages are later in that class. The prospect thus presented to us is, it must be admitted, a lugubrious one. The better we educate our people, and the greater the facilities we give to boys and girls of ability

in the lower classes to rise in life, just by so much shall we deteriorate the race intellectually, for psychical characters are not manufactured by school or college, but are bred in the bone ; and if our intellectual classes are physically enfeebled by their intellectual exertions, are enervated by wealth and the love of pleasure, or restrained by prudence born of a wrong standard of life, so that they fail to supply us with a due proportion of intellectuals, then progressive decadence is in store for us.

For my own part, however, I am inclined to think that intellectual decadence, if it is upon us, is not altogether due to the causes assigned by Professor Pearson and Mr. Balfour, and is not necessarily destined to deepen as time goes on. In a people like ours, there is always outside the actually intellectual class a still larger class potentially intellectual, with abilities incompletely evolved because never called forth, but capable under stress of circumstance of the higher development, just as an ordinary working bee is capable of conversion into a queen by appropriate feeding. This potentially intellectual class, more prolific

than the actually intellectual, may make up for its deficiencies and breeding true, or with favourable variations, supply us with intellectual leaders as good as any we have hitherto had.

Then I am quite sure that the educational ladders, provided hitherto to enable children of the humbler class to climb up in the social scale, do not by any means ensure the transference of all the intellectuals from the lower to the higher level. They are mounted by the nimble, the quick-witted, the precocious, whose intellectual energies are in many instances soon exhausted, and around the foot of these ladders there remain numbers of children of really finer intellectual power but slower of growth than those who have scrambled up them. We have thus in our humbler or uneducated class, as it is called, a reserve of intellectuals of undiminished fertility, capable of supplying recruits to the intellectual class of the next generation. Many of our finest intellectuals have sprung from the unintellectual class, and genius is generally more or less of a sport.

My own view is that any dearth of ability

from which as yet we may be suffering, or by which we may be threatened, is to be ascribed not only to the infertility of the cultivated classes, but also to the artificial production of stupidity in various ways, and to the incessant draining from the country, which is the fit and proper breeding-place and rearing-ground of intellect, of the best elements of our people, to be swallowed up and exterminated or deteriorated in our big towns. We keep nipping off the buds of promise, and if we insist on having lots of green gooseberry tart we must be content to go with less of ripe gooseberry jam. As Dr. Ogle has said, "the combined effect of the higher mortality of the town, and of the constant immigration into it of the pick of the rural population, must clearly be a gradual deterioration of the whole, inasmuch as the more energetic and vigorous members of the community are consumed more rapidly than the rest of the population." "The country community," remarks Professor Ripley, "grows from its own loins; the city community grows almost entirely by immigration." The country community, mentally as well as physically, develops

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from within. It is conservative, strong, steady, tenacious, and transmits its mental characteristics little altered to the next generation. The city community, on the other hand, accretes largely from without. It is progressive, mobile, fickle, of unstable equilibrium, and under the stress of competition undergoes mental modifications, which (*Pace Weissmann*) it passes on to its successors. And the consequences of the increased instability of the city community are patent enough. Insanity (distinguished from mental defect) and suicide, both essentially characteristic of industrialism, are more frequent in business centres than in the homes of agriculture. This does not, however, signify that the mental powers are really more active in the one than in the other. The notion, indeed, that the country labourer is duller in intellect than the man of the same class in the town is untenable. "It is a common assumption," says Professor Wright, "that the countryman is of so limited capacity that he makes use of no more than 300 words. What a libel! The number of words in dialects at the most moderate estimate is

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over one hundred thousand. In Yorkshire alone I can call to mind 30,000 different words. If we take the whole of the dialects and put them together, as representing the vocabulary of the working class of this country, and exclude from the English dictionary all technical terms and obsolete words, I venture to say that the number of dialect words will far outnumber the words of the dictionary."

And not less untenable than the notion that the agricultural labourer is dull of intellect is the idea that the city urchin is cleverer and better endowed mentally than the little yokel. Some years ago Mr. Horsfall asked the opinions of the head-masters of two large pupil-teacher centres on this point. In both centres there were a number of pupil-teachers from the schools of a large town and others who had been taught in country schools. "Both the masters said that though, as a rule, the urban young people were at first brighter and quicker, those from the country, in the long run, showed more staying power, and that their knowledge of country things gave them a great advantage over their town comrades." The conclusion of these masters

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is in complete accord with that which I arrived at a number of years ago, after a comparative examination of some London Board and Scotch Parish Schools. I found the London children much sharper, more vivacious, and, it must be admitted, more attractive in demeanour than the Scotch children ; but the latter, although somewhat stolid and awkward, had decidedly more grasp of intellect and more sound knowledge.

The rule seems to be that the mental development of children is hastened by city life, but soon stops short. Up till thirteen or fourteen they are precocious, and then come to a standstill. "At its best," says Dr. Stanley Hall, in his work on *Adolescence*, "metropolitan life is hard on childhood, and especially so on pubescents, and children who cannot pass those years in the country are robbed of a right of childhood that should be inalienable, and are exposed to many deleterious influences which jeopardise both health and morals."

City life at its best is bad for children, involving as it does early puberty, exciting distraction, superficiality of knowledge, insuffi-

cient repose, and the want of the soothing influences that the country affords, and at its worst, when it means a tight squeeze in squalid dwellings, poor food, foul air, foul language, contact with vice, and manifold temptations, it is utterly demoralising. The Chief Constable of Glasgow, who had to report an increase of juvenile crime in that city, notwithstanding the most strenuous efforts of the police to prevent it, informed the Royal Commission on Physical Training that juvenile depravity was regulated to a large extent by the home influence on the child, the period between twelve and fourteen being that when the mind is most susceptible to influence for good or evil. "Amongst the lower class in the city," said Mr. Ross, "of course one finds the children most depraved, the parents or guardians in many cases being criminals of the lowest possible standard. Street trading is undoubtedly a curse to this class of children. It has been proved again and again that the street gamin is second to none in vice and wickedness of every conceivable kind—in fact, he reduces the commission of a crime to a fine art. If, however, he is taken from his evil

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surroundings and placed in an industrial school or reformatory, he, in the majority of cases, turns out a success in life."

The facts and figures I have been quoting represent the city as an instrument of physical, intellectual, and moral degradation. They represent it as sucking in the crude vigour and vitality of the country, sophisticating and enfeebling them by its rigorous competition, and ultimately turning them into inefficiency. It seems obvious that if the city goes on growing at the nineteenth-century rate, and under nineteenth-century conditions, it will dry up the reservoirs of strength in the population, and leave an immense proletariat of inferior quality and without commanders.

But the shield we have been examining has another side. Big cities are with us and are likely to remain. They have sprung up in obedience to economic laws, and they contribute to wealth, for production increases with increasing concentration of population, and wealth redounds to the advantage of the whole country. They favour specialisation, and enable every man to make the best of any talent or skill he may possess. The markets they open up

stimulate improvements in agricultural methods, and the industries and commerce they establish conduce to good government and individual liberty. They are the nurseries of the Arts and Sciences. And as to the evils attending them, on which I have been enlarging, they are not all inherent in their very nature, but are largely accidental concomitants of their mode of growth, and the offspring of the ignorance and stupidity of their inhabitants. Many of these are in process of mitigation, and I daresay it occurs to you that if you had a free hand in demolishing and reconstructing one of our great cities with, say, the cost of the South African War at your disposal, you could free it from much of the opprobrium in relation to sanitary matters that has hitherto attached to it. But such wholesale remodelling is scarcely practicable, and even were it accomplished, the city would still probably fall short of the country standard of health, even if that standard remained where it is at present, and were not raised like that of the city. For as things now are, the country is in many parts guilty of sanitary offences as heinous as those of the towns, and is only saved from their

consequences in an equal ratio by the wider elbow-room it affords, and the fresh air and unpolluted sunshine it enjoys by nature's bounty. The last Royal Commission that reported on rural housings described the conditions under which many agricultural labourers live as "physically and morally unwholesome and offensive." A London Association that in 1897 conducted a systematic inquiry into the state of 240 country villages with 10,000 dwellings, declared that in one half of these villages the cottages were bad, and that in some thirty villages there were cases of gross overcrowding. Mr. Walter Crotch has stated that the result of his own very extensive and searching investigation had been "the discovery of whole villages without a drop of water from end to end; of cottages without even the ordinary conveniences which the law of common decency demands, and of poor people having their homes let while yet they lay quivering in the throes of death." "Week by week," he goes on, "the most shocking cases of overcrowding are reported in the newspapers, and there can be no doubt that this huddling together of people of both sexes

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and of all ages in the same room is a source of frightful immorality."

Mr. Clement Edwards said in 1900 that many of the inhabited cottages in the South and West of England were in a hopelessly dilapidated condition, with gaping walls and rotting roofs, and were, moreover, terribly overcrowded. Some of the facts he reported were positively revolting in themselves, and much worse in their suggestions of inevitable social and moral results. As to sanitation, it was non-existent. Miss Constance Cochrane of the Sanitary Institute quotes a case in Cambridgeshire in which eleven members of one family were all sleeping in one room owing to the scarcity of cottages in the village. Private enterprise has failed to furnish anything like adequate accommodation for agricultural labourers, and owing to heartless indifference, indolence, or official obstruction—perhaps in some degree also to their own complicated ambiguities—Acts of Parliament, such as the Housing of the Working Classes Act of 1890, have remained practically in abeyance. The result of all this is that lamentable abuses—which perhaps the

Amending Act of 1900 may in some degree remedy—still abound on every hand, and that our scattered hamlets, instead of being idyllic abodes of peace, purity, and health, have become foci of discontent, dirt, and disease.

But in spite of all this, the country, measured by every standard, remains more salubrious than the town; and, as it is certain to participate in those sanitary improvements which, in the progress of medical science and of governmental activity in such matters must come, still further to lower the town death-rate and raise its vital energy, it will probably always maintain its position ahead of the town in salubrity. “The life of the great city,” said Mr. Henry George, “is not the natural life of man.” He has an affinity for the open fields, and just as the mortality of city adults must always exceed that of rural adults, on account of the more dangerous nature of town occupations, so must the health of a town population as a whole be inferior to that of a country population, because of the more unfavourable nature of its topography. The grouping and close

proximity of houses interfere with ingress of sunlight and movement of air, and facilitate the spread of zymotic diseases, which often leave permanent debility and defects behind them. The close agglomeration of numbers of human beings, especially in a state of indigence, is conducive to uncleanliness, and to the generation and diffusion of poisonous exhalations of many kinds. And the larger the grouping, and the closer the proximity and the denser the agglomeration, the greater do the risks become, so that in the interests of humanity there should be some limit to town extension and stringent regulation of town organisation. Industry says men must aggregate. Sanitary Science says they should be permitted to do so only as far as is not incompatible with the welfare of the race, and under well-understood safeguards.

We have been contrasting the merits of town and country from a health point of view, and the conclusion must be that while the country is entitled to the preference of the Sanitarian, both are urgently in need of his attentions. Excellent fruitful work has already been done in both, but much remains

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to be done, and, as I have already said, the most clamant want of the moment is, it appears to me, the application of remedies to relieve the pressure caused by the increase of population in urban centres.

You are acquainted with the remedies which have been proposed for that state of things, viz. regulations directed against over-crowding; the acquisition of special areas by the authorities for the obligatory re-housing in the same neighbourhood of those disturbed under parliamentary powers; and the acquisition by municipalities of vacant land for the construction of suitable dwellings. These are excellent as far as they go, but seem to me to be palliatives rather than remedies. They shift the load a little but do not really lighten it, and it has been, perhaps, the perception of their futility that has been responsible for the half-hearted manner in which they have been applied. Real relief is only to be obtained by establishing an outflow from the centre to the circumference, and it is by affording increased facilities of locomotion that this may be done. It is to the new motive power that is now advancing with such giant strides that we

must look for the removal of some of our housing embarrassments. Railway extensions, tube-railways, surface and sub-surface tramways, and motor omnibuses and cycles will inevitably bring into existence a number of new suburbs around our big cities, to which, if the cost of transit be kept low and rents remain modest, many of the poorer classes who are not compelled to live near the factory or shop will resort, all the more readily if a shortening of the working day gives time for the journeys to and fro, and if associations be formed to help them to become the owners of their houses. And to these suburbs, should the cost of transit and the time occupied by it or high rents prove prohibitive to the working classes, the well-to-do will in numbers retreat, making room for their humbler neighbours in the inner circles. It is probable, too, that these new suburbs would in some degree intercept the streams of population that are perpetually flowing into the towns from the country, for statistics show that as regards London, at any rate, immigrants settle mainly in the most outlying parts.

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The new suburbs of towns will, of course, always spring up on lines of communication, and where facilities are offered for building speculation, and spread out around; but it is to be hoped that they will be taken in hand in time, and means devised to limit their indefinite expansion. Mr. Charles Booth has said that towns advancing show a noticeable tendency to shoot out tongues like the sun's corona, the intervals between them being filled up later, and it is this filling up of the intervals between them that should, if possible, be prevented. Island suburbs are well enough, but when they swell out, become continuous, and form a girdle round the parent town, they aggravate its evils, and help to strangle it. It has been proposed that air should be supplied to the centre of great cities by mechanical means—by the Shone vacuum system, for example, in connection with tube railways; but infinitely preferable to any such artificial arrangement, necessarily finical and liable to break down, is a liberal scheme of natural ventilation. There should, it seems to me, be maintained, in connection with all great cities, a series of broad avenues

converging towards them from all the points of the compass, free from buildings and covered with vegetation. The parks and open spaces in our cities are called their lungs, but the lungs are not of much use without the wind-pipe, and the green avenues I suggest would act in that capacity, and allow an inrush of fresh air and the escape of the vitiated air which is always accumulating in cities. These avenues, I have said, should be clothed in vegetation ; and, to my thinking, the preservation of vegetation, not only around our great cities but throughout the country generally, is becoming a matter of grave import. Sir James Dewar once calculated that a healthy man evolves on the average about 2 cwt. of carbon in the form of carbonic acid annually; and as an acre of the best cultivated land fixes annually about 22 cwt. of carbon, it follows that one acre of land can economise as much carbon as is supplied by eleven persons. The Crystal Palace covers an area of sixteen acres ; if the atmosphere had to be kept pure by interior vegetation, without external ventilation, it could not permanently contain more than 365 persons without an increasing aerial

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contamination. But the vegetation in the large Crystal Palace, this island of ours, is being constantly reduced in amount. Enormous tracts of land once cultivated have been appropriated by highways and railways, and works and habitations, and cinder-heaps, and at the same time there has been an enormous increase in the output of carbonic acid and the demand for oxygen by combustion in the consumption of fuel by manufactures of all kinds and for domestic purposes, and by the respiration of animals and human beings. The revivification of the air by home industry is gradually decreasing, and the day may come when we shall be entirely dependent on imported oxygen as well as imported food, and will have to trust to the ocean to dispose of our surplus carbonic acid. At present the air of our large towns, and especially those with narrow streets and towering buildings, is often a very deleterious compound.

It is to the rise of the suburb—the island suburb set in a sea of chlorophyll—easily accessible, well planned, honestly built, that we must look in the first instance for the

removal of some of the afflictions that over-crowding has brought upon us. But the suburb, while it may do much, cannot do everything, and there are other sources of relief which it is our duty to turn to and to improve. We must take measures to reduce the influx of population into our already congested towns, and to keep on the land those who have been born and brought up on it, and to bring back to the land those who have inconsiderately left it. Beyond the city and its satellites, we must afford to those who are weary of the dirt, confinement, dreariness and ugliness of overcrowded quarters, room and opportunity for healthy, moral, and physical life. And there are several ways in which this can be done which I can but name. We can create new cities on new sites, with all the advantages and none of the drawbacks of the old ones—garden cities of the type so eloquently and convincingly advocated by Mr. Howard, in which the needs of industry and the needs of humanity will be reconciled. Charles Kingsley in his philanthropic ardour foresaw something of the kind, for he dreamt of cities which should be “a complete inter-

penetration of city and country, a complete fusion of their different modes of life and a combination of the advantages of both, such as no country in the world has ever seen." And his vision has come to pass. We have Bourneville and Port Sunlight—cheering oasis in the industrial desert—and, better still, we have Letchworth, gradually coming into being, on a broader basis and with greater amplitude of design. Letchworth is still incomplete, but two visits to it have enabled me to appreciate the judicious way in which it has been mapped out, the excellence of all its sanitary arrangements, and the rapid progress it is making. It is full of promise, and it would, it seems to me, be a national calamity should any want of financial support prevent the project in its entirety from being carried to a successful issue. It is to provide for 30,000 inhabitants, and that will not be much of a depletion for congested London, but whenever Letchworth is an accomplished fact other garden cities will be undertaken. The transference of manufacturing industries to the country is feasible—it has indeed been going on for some time both in this country

and America, in the avoidance of high rents and rates; and where suitable sites in the country can be provided with suitable accommodation for workers, with co-operating industries around, and with facilities for obtaining power, industries will congregate and garden cities arise.

Another way in which we can tap our great cities of their clogging superfluities of population is by establishing, in our dominions beyond the sea, land colonies, under some such scheme as that so ably excogitated by Mr. Rider Haggard. There are in our cities crowds of men and women brought up on the land, who have drifted into the city, and tossed about there as social flotsam, miserable failures, who with families of young children would gratefully embrace the chance of returning to conditions such as formed the surroundings of their youth, and of rectifying their own mistakes by placing their children's feet on the path of prosperity. Such families, carefully selected, settled in parties, if possible made up from the same towns at home, in well-chosen localities, under skilled and sympathetic management, and with necessary financial

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assistance to start with, would undoubtedly do well, as have done the indigent settlers at Forts Amity and Romie, while their removal would clear the air of our towns at home.

But the best of all methods, and the most promptly available for checking overcrowding in towns, is by improving housing in the country. We are told that the flower of the agricultural class flock to the towns because they dislike the monotony of country life and long for excitement and variety. That is so, no doubt, to a large extent, and perhaps our present system of education is calculated to foster discontent with the peasant's lot, and engender vague ambition, restlessness, and a thirst for rousing stimulants, but I suspect that another contingent of country folk find their way into the towns, not so much attracted by their glamour as repelled by the dingy wretchedness they leave behind them. Agriculture is, after all, the most varied and least monotonous of employments, and could the cottages of the labourers be made wholesome and attractive, and the village life invested with some interest, many who now migrate to the towns would stay at home, and many

who are in the towns and have tried them and failed would be glad to be translated back to the land. I feel sure that many of the labouring class, under the goad of poverty, quit with reluctance the fields they have tilled, and cast many a lingering longing look behind at the dilapidated hut that sheltered their childhood. The Anglo-Saxon has always had a deep-rooted attachment to his "ham" and his "ton." Home-sickness is not, perhaps, as common as it used to be, but the homing instinct still exists amongst us, and is to be diligently kept alive if our race is to avoid disintegration. Nothing has seemed to me to presage the pouring forth of the vial of the seventh angel more imminently than the proposal, seriously made, that all infants at birth should be taken away from their parents and brought up in public institutions, foundlings of the State, a system under which all virtue would forthwith go out of us, leaving us mere dry husks of mankind. And nothing has seemed to me more minatory for the future of our Empire than the decay—for there is some decay—of home life amongst us. The affluent classes in great numbers voluntarily resign its

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charms for the luxurious indulgence of the Club and Restaurant, and the round of pleasure, as it is called ; and the poor, through no fault of their own, are in large numbers deprived of them, for it is impossible for the tender associations of the home to evolve in a temporary burrow in a town warren. They have a tenement or lodging, but no home ; but a vestige of the old home sentiment is sometimes seen, as Mr. Bray assures us, in the fidelity with which they cling in poverty to some bit of furniture—a table, a chair, or clock, that has stood the wear and tear of time. But if we are to rescue the submerged tenth and redeem the very poor, we must somehow see that decent homes are provided for them. The finest feelings, the firmest principles, are nourished in the home ; a genuine man's joys, hopes, and ambitions should centre in it. Truly did the great poet of my country—who was not only a poet but a deep-seeing social reformer—exclaim :

To make a happy fireside clime,
For weans and wife ;
That's the true pathos and sublime
Of human life.

For the want of the "happy fireside clime" the poor are doubtless themselves often to blame. Of the idleness, thriftlessness, and drunkenness that keep them poor and homeless I need say nothing; these are the theme of daily homilies, but there is a habit they have formed which I think in some degree contributes to their penury and is worth noting, and that is the habit of wandering purposelessly from place to place—a phase of the *mania errabunda*, as it has been called, which possessed the Ancient Mariner, and keeps the tramp and the globe-trotter moving on. Without any valid reason, large numbers of them are constantly changing their abodes, and an enormous sum is spent annually on removals that might be more profitably employed in making the home habitable. Removals are, of course, largely instigated and justified by the search for work or for better surroundings, by growing family requirements, and improving circumstances; but beyond all that they go on, on the large scale, simply to gratify the love of change or in a foolish spirit of rivalry. These poor people keep shifting about in sheer restlessness; having dirtied or

damaged one dwelling they pass on to another. A friend of mine in Scotland built some model cottages for his labourers, and on visiting them was surprised to find that the bedrooms upstairs were unoccupied and had been converted into stores for apples, onions, and potatoes, while the families were herded together below. On inquiring the reason for this, he was told that these labourers did not care to have more furniture than they could conveniently remove in one cart. This sort of thing is very inimical to home-making, for the home is a slow growth, that does not, like Jack's bean-stalk, shoot up in one night, but must have time to take root and won't bear frequent transplanting. And it is inimical also to success in life. Mr. Patterson, the Master Mechanic of the Grand Trunk Railway, says : "I find among the class of workmen that comes from the Old Country there is a great tendency to run from one situation to another ; in fact, a number of them seem to have an aversion to permanent employment. This wandering spirit is very detrimental to a man's progress."

But apart from the improvidence and

stupidity of the poor themselves, the home, or anything like it, is still beyond the reach of many of them, and in some districts it is a vanishing quantity. It is for the sanitary and the social reformer to work together to resuscitate the home, to augment the taste for it, and make it more and more palatable in town and country.

On some future occasion you will, perhaps, allow me to say something about the town-homes of the poor, and to offer a few suggestions in connection with the highly complicated problems they present for our consideration, amongst which suggestions the not least prominent will be one for the strengthening of your hands. I feel keenly that if the housing question in towns is to be adequately dealt with, the Sanitary Inspector must have more power in his elbow than he has hitherto had. He must have security of tenure, and I am glad to be able to tell you that the Preventive Medicine Section, over which I presided at the recent Public Health Congress in London, passed a resolution desiring the Council to represent to the Government the urgent importance of giving

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security of tenure to the Sanitary Inspector, as well as to the Medical Officer of Health. Then the Sanitary Inspector must have more effective control over the nuisances he discovers, and the only way to give him that is to make his "intimations" equivalent to a legal notice. These intimations are, I understand, now often treated as waste paper. There are agents and owners of property of the baser sort who delight in thwarting and putting obstacles in the way of Sanitary Inspectors, and to such gentlemen I should give short shrift, showing no particular indulgence to the slum-owner generally. Dr. Harris, Medical Officer of Health for Islington, reported lately that in his district 60,296 visits were last year paid by the Sanitary Inspectors to 7133 properties, on an average $8\frac{1}{2}$ visits to each. That indicates, I think, much passive resistance, much waste of energy, much unnecessary maintenance of dangers to health, and I agree with Dr. Harris that in this matter "law ought to be brought into line with common sense" without delay.

It is to rural housing, more especially in its relation with the relief of overcrowding

in towns, that I had intended to direct your attention to-day, but my excursions into the approaches to that subject have left me only a few minutes in which to touch on it. The main point, however, is—and on that I have already insisted—that by improving our country cottages and adding to them cottages of an approved type, we shall in some degree check the exodus from the country, and even set up a backwash from the towns. And in order that we may do that we must have amendment of the building bye-laws, that have been in no small measure answerable for the depopulation of rural districts and for the congested state of towns. That these bye-laws require to be overhauled and remodelled no one who has read Mr. Wilfred Blunt's article in the *Nineteenth Century*, or the speeches made by the members of the deputation that waited on Mr. Walter Long, then President of the Local Government Board in November last, can doubt. The unfortunate clause in the Public Health Act of 1875, providing that Poor Law Districts might declare themselves Urban Districts and so acquire powers similar to those exercised in towns, and frame bye-laws

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of their own, has been the source of all the mischief. Under this clause half the Rural Districts of England have acquired Urban powers, which, being exercised by persons having for the most part an interest in urbanising the district—jobbers in residential land ripe for development, tradesmen, contractors, and local builders—have been used as an instrument to prevent the erection of dwellings suitable for agricultural labourers, and to tie the hands of landowners willing to provide such dwellings. No better example of this can be adduced than Mr. Wilfred Blunt's own case. Having himself experimented with an iron bungalow which he found singularly comfortable and commodious, he directed his estate carpenter to erect on his property in the New Forest, where there are no builders' bye-laws, two cottages, intending, should they prove successful, to make them the model for cottage-building in Sussex. And highly successful they proved. He found they could be erected at the cost of £130 for a building covering 700 feet area, with a verandah of 240 feet more, and an outbuilding containing wash-house and closet—"as snug and sanitary a

home as any poor man could wish to inhabit, for there was a fireplace in every room, roof ventilation, and ample door and window space."

But when Mr. Wilfred Blunt came to Sussex, where the London building bye-laws are in force, there was a lion, and a very fierce lion, in the path. The plan of a cottage was submitted to the Rural Council, and no objection was taken to it until the building materials had been deposited on the ground. Then, however, notice was given that the plan was disapproved by the Council as violating the bye-law. This notice Mr. Wilfred Blunt thought it his duty to disregard, and went on with the cottage, which cost £130, and which, with an additional quarter of an acre of land, he could let without loss at 2s. 6d. a week, or 1s. a week less than an old cottage it replaced. But alas for rural economy! The builder was summoned for building with other than bricks and mortar, and an action was brought against Mr. Wilfred Blunt, as a result of which a continuing penalty of two shillings a day was inflicted on him until the model cottage was pulled down.

It is clear that a check must be administered

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to rustic Bumbledom, and a stop put to the application to purely agricultural areas of regulations intended for towns, and which in towns have had an altogether salutary effect in preventing the construction of unsafe and unsanitary houses. But I cannot go as far as some who have urged that there should be no bye-laws in country districts, or that such bye-laws should not apply to any new building on a freehold property where such building is more than a given number of yards from other dwellings or past the property of adjacent owners. In regard to sanitary arrangements, bye-laws seem to be as necessary in the country as in the town. It is not license, but reasonable liberty that is wanted ; not looseness, but elasticity, and it is to be hoped that this will be realised in the model code of bye-laws for rural districts promised by Mr. Walter Long, and in which cottages in certain situations are to be permitted of wood or other material.

A powerful impulse has been given to improvement in country housing by the articles on the subject which have appeared in the *Country Gentleman* and *Spectator*, which have, as by natural magic, invoked the en-

chanting village at Letchworth, which is now on exhibition, and which I would recommend every sanitary inspector concerned in rural affairs to visit and study diligently. He will there, while enjoying a pleasant picnic, have an instructive lesson, and be able to satisfy himself that a serviceable and comely cottage, in all respects suitable for a labourer or working-man and his family, can be built for £150, including builder's profits. He will there see cottages of many different patterns, and built of many different materials, of stone, wood, brick, iron, concrete, cement, steel, and plaster in various combinations, and will obtain from the catalogue full information about the price and specifications of each. He will see a marvellous display of ingenuity and contrivance in the fitting in of domestic requirements, and of making the most of next to nothing. No doubt his critical eye will detect flaws here and there, ceilings too low, windows too small, etc. etc., but almost everywhere he will perceive an intelligent deference to the claims of modern sanitation. The cottages vary greatly; each has an individuality of its own, but sunniness, airiness, and cosiness

characterise almost all of them. They appeal to many tastes, but to no tastes that are vulgar or debased. They are pretty, but their prettiness is subordinate to their utility; they are picturesque, but not pretentious. Simplicity and cleanliness are the dominant ideas, and they are cheap with a cheapness that is unbelievable until they have been actually seen and examined, and compared with the estimates. Think of a detached cottage, well proportioned and artistic in design, with a living-room with range 15 ft. 6 in. \times 11 ft. 4 in.; scullery with bath, hot and cold water, 9 ft. 4 in. \times 7 ft. 6 in.; three bedrooms, 9 ft. high, 13 ft. 4 in. \times 9 ft., 13 ft. 4 in. \times 9 ft. and 8 ft. 6 in.; with pantry, two cupboards, coal hole, shed for wood, w.c., water laid on, drains connected, rain-water butt, floor of scullery and pantry tiled, and say if it is dear at £150.

There are cottages at Letchworth adapted to different climates, and suitable to different districts according to the different materials of which they are constructed. I saw some that I thought would scarcely survive a blast of Boreas on a Scotch hill-side, others that could withstand a hurricane; some that would be in

place where timber is abundant, others where brick or iron are in the ascendant.

The village at Letchworth, unique in its diversity of cottage contours, planted on a bare common, but in sight of stately elm-trees circling a venerable church, and gaudy with many floral dyes and green embroideries, recalls, of course, Mrs. Hemans's verse :

The cottage homes of England !
By thousands on her plains,
They are smiling o'er the silv'ry brooks,
And round the hamlet-fanes.
Through glowing orchards forth they peep,
Each from its nook of leaves,
And fearless there the lowly sleep,
As the bird beneath their eaves.

They recall that verse, but with a difference, for while Mrs. Hemans's cottage homes gave delight to the eye by their rugged and peaceful external beauty, they must have brought anxiety to the soul of the sanitarian who peeped into them by their primitive squalidity. The cottage homes of Letchworth are not less gratifying in their sanitary than in their æsthetical aspects, and may be slept in by their lowly inhabitants with a sense of security that the cottagers of a century ago, when

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typhus and small-pox patrolled the land, were scarcely entitled to feel. These cottages have dealt the death-blow to foolish restrictions on country housing. That village leads the way in a new movement to which all sound sanitarians will cordially wish success.

A survey of some of these cottages at Letchworth, so quaintly pretty, so minutely commodious, so hygienically correct, so reasonable in price, suggests that they should have attractions for the well-to-do not less than for the labouring class. Perched on some beetling cliff or breezy down, bosomed in some bosky dell, or planted in the fields neighbouring some quiet hamlet, they would form a delightful week-end or holiday resort for families of moderate means. For children living in London, or other populous city, the seaside town, with the vulgar riot of the sands, is not the place in which their vacations can be most healthfully or profitably spent. They should be brought into living contact with nature, be enabled to form friendships with trees and animals, to pry into the secrets of insects and birds, and taught to take more pleasure in the hedgerows with their "profuse wealth

of unmarketable beauty," than in the shop windows with their flaunting temptations. The cheap cottage as a holiday-home would create new family affinities, promote the unfolding of faculties that are apt to remain dormant or stunted amongst bricks and mortar, and teach self-help and independence instead of the feeble snobbery that meets every want as it arises by ringing the bell, for I saw no bells electric or other in these cottages. It would obviate the apprehensions of infection that are often not unjustifiably felt in taking possession of lodgings or furnished houses at seaside resorts, and elicit taste and ingenuity as no mere hired and temporary residence can do. Its decorative improvement would be a recreation, and the owner would be proud to say of it—"a cheap thing, but mine own." It is thought sometimes that frequent changes of scene are wholesome and educational for children, and so they are shifted year after year to one watering-place after another, which, in so far as they come within their observation, are all very much alike. No doubt a variety of new impressions and world-wonder are valuable, but these should come after child-

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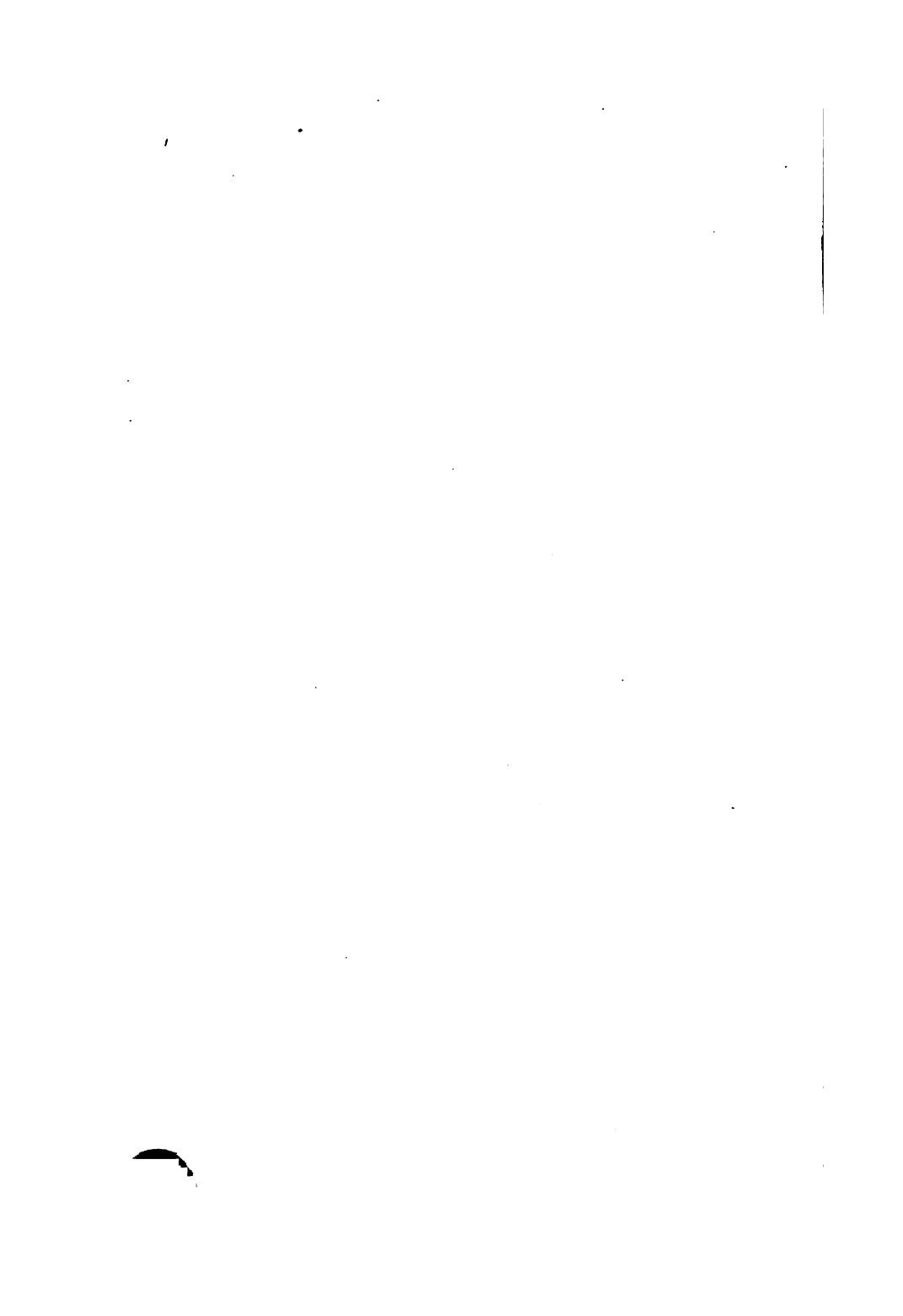
hood is over. The apprenticeship should precede the travels, and for young children it is far better that they should be allowed to wind their affections round some one spot of earth, and slowly to form tender associations which will be sustaining and gladdening to them to the end of their days, than that they should dissipate their interest in sight-seeing, and be plied with a succession of images as immemorable and unemotional as the figures of the kaleidoscope. The farm-house has no doubt many advantages as a holiday retreat, but the cheap cottage, as a family seat and permanent possession, is infinitely superior. I hope that some of my sanitary inspector friends in the large towns may see their way to acquire one in some suitable locality. Of well-selected plan, and with some small alterations and additions such as my sanitary inspector friends will well know how to devise, raising the price somewhat upon that of the Letchworth model, but still leaving it within the category of cheapness,—such a dwelling should be a source of health and pleasure, and also a good investment.

I have taken a wide, a hurried, and, I fear,

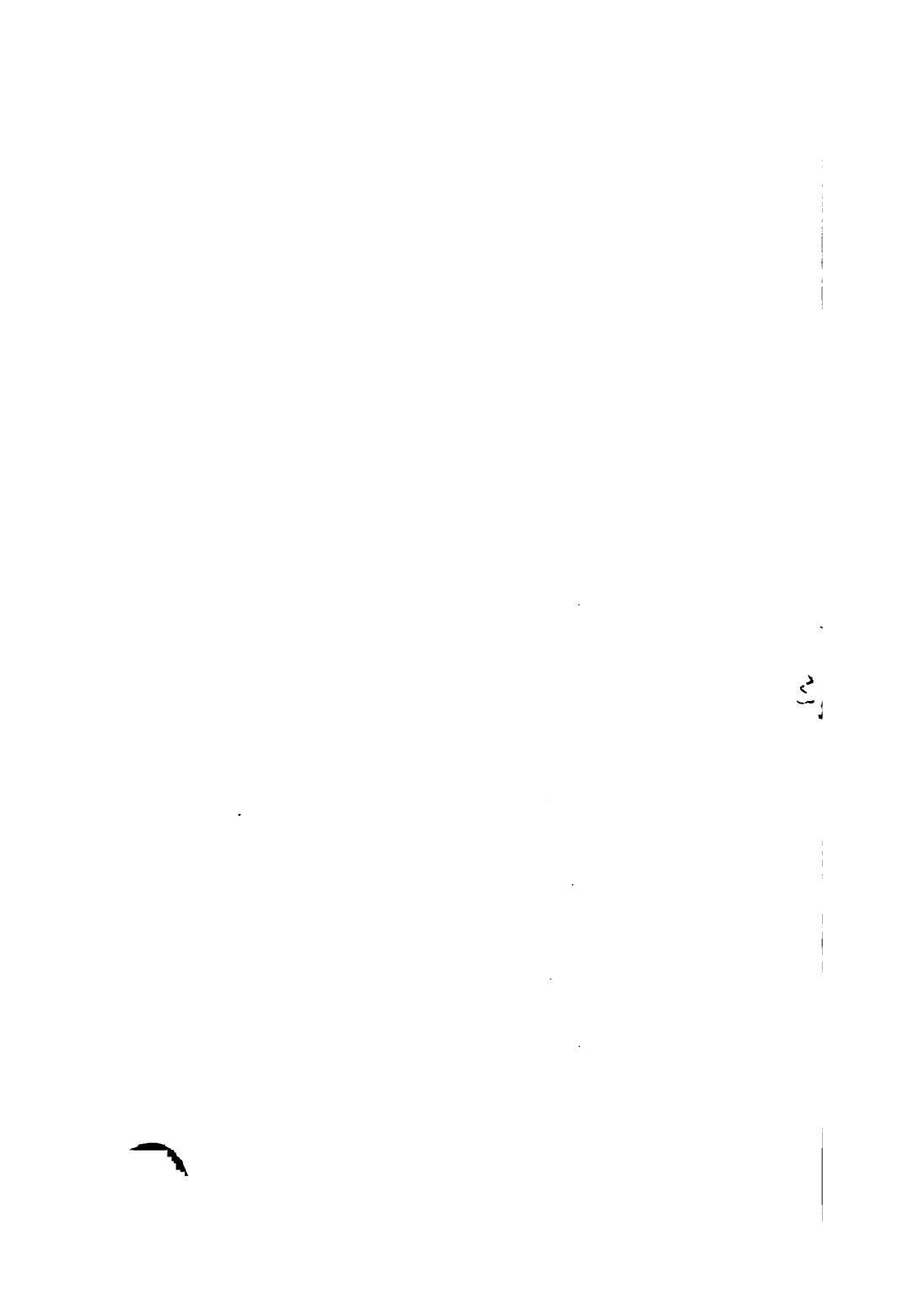
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a somewhat confusing sanitary outlook, but, when I meet you, so many topics in which we are mutually interested press for attention that I am tempted to attempt too much. If at any point in the outlook I have interested you, or suggested to you some new thought, or some new aspect of an old thought, I shall be well content.

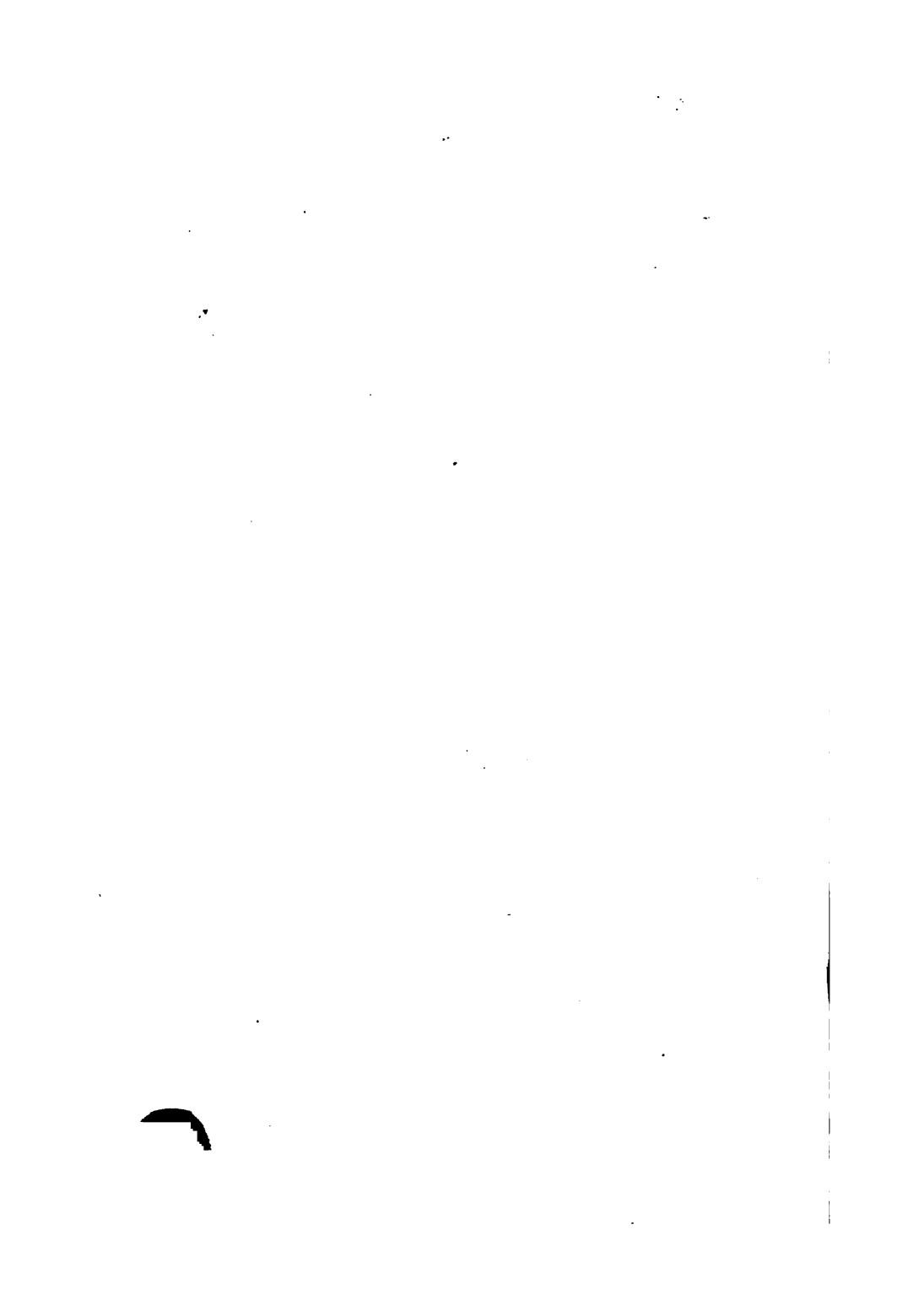
THE END











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